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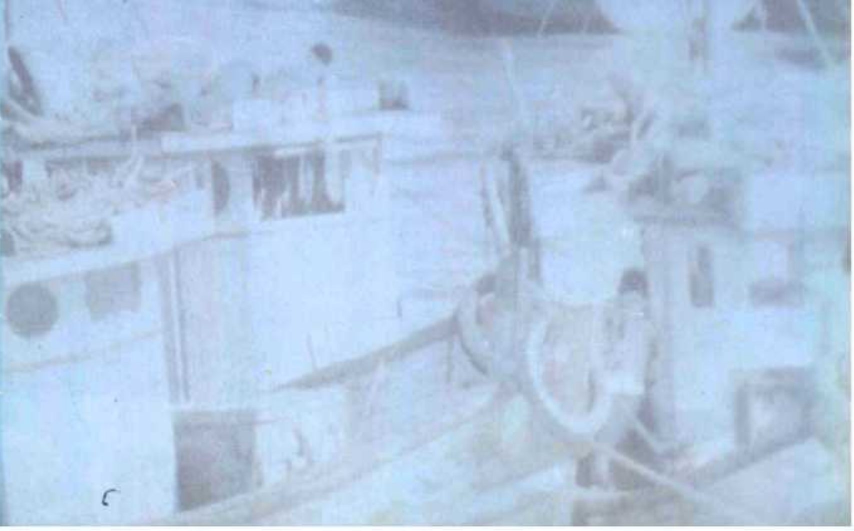
The Journal of the Bay of Bengal Programme
Inter-Governmental Organisation

A quarter century after:

The BOBP's relevance today

"It can be honestly said that the BOBP quarter century saw a more wide-ranging, sustained, intensive and in-depth study of small-scale fisheries and fisherfolk communities in the Bay of Bengal region than at any other time in history".



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A quarter century after: The BOBP's relevance today

One of the development landmarks of 2004 is the completion of a quarter century of the BOBP, which began from Chennai in 1979. It can be honestly said that the BOBP quarter century saw a more wide-ranging, sustained, intensive and in-depth study of small-scale fisheries and fisherfolk communities in the Bay of Bengal region than at any other time in history.

BOBP was a pioneer in the region in many areas of small-scale fisheries development and management, and in systematic debate, discussion and documentation on these subjects. The quarter century's work led to scores of lessons, learnings and legacies in all areas of small-scale fisheries. These have been documented through print, video and CD.

The BOBP is now an IGO (inter-governmental organisation). On 7-8 September 2004, the first Governing Council of BOBP met. Delegates from Bangladesh, India, Maldives and Sri Lanka approved of the report for the first IGO year (April 2003-August 2004), also of the workplans for the year to follow (October 2004-December 2005). The Governing Council meeting is reported elsewhere in this issue. Delegates hailed the BOBP quarter century.

What's the significance of this quarter century? Two articles in previous issues of ***Bay of Bengal News*** (December 2000 and January 2002-March 2003) detailed the Program's work in many disciplines and many countries. To put it in a nutshell: the Programme implemented innovation and action in fishing technology, small-scale aquaculture, post-harvest technology, fishery resources, extension among fisherfolk communities, women in fisheries, people's participation, bio-socio-economics, pollution control in fishing harbours, safety at sea, environment, fisheries management.

The Program's impact was equally significant in the areas of training (hundreds of workshops, training courses and study tours at many levels), documentation (publications, video films and CDs), and regional co-operation (seminars and consultancies).

Special mention may be made of BOBP's third phase which focused on fisheries management: that is a major priority of fisheries everywhere even today. The Program's work led to a gradual change in perception of fisheries management in the region. Once advocated only reluctantly, fisheries management is one of today's buzzwords. The Program's work in community-based fisheries management (CBFM), particularly in Thailand and India, and in introducing and promoting the Code of Conduct for Responsible Fisheries, is very relevant today – in fact it needs to be strengthened.

Three workplans were approved at the Governing Council meeting – Capacity-Building and Information Services for Fisheries Development and Management in the Bay of Bengal Region; Women in Fisheries; and Fisheries Resources Management. These will serve as modest but important landmarks in the BOBP's ongoing effort at enabling and catalysing sustainable fisheries development and management in small-scale fisheries. All workplans relate to the period October 2004-December 2005.

Capacity-Building and Information Services for Fisheries Development and Management in the Bay of Bengal Region

This project will be a part of the BOBP-IGO's mandate to assist member-countries in strengthening their national capabilities in development and management of coastal fisheries.

- The marine fisheries technical guidelines of the Code of Conduct for Responsible Fisheries: Vernacular versions will be prepared and printed for dissemination in member-countries.
- A national workshop on implementation of the CCRF will be organised in Sri Lanka. (Similar workshops have been

organised in Bangladesh, India and the Maldives.)

- A Regional Information Network is to be set up through the BOBP-IGO website. It will provide information on development, planning, research and training. These will assist member-countries in strengthening their capabilities in development and management of coastal fisheries.
- A fishermen's week is to be organised in member-countries to help promote a participatory and community-based system to manage fisheries and aquatic resources.
- Information dissemination: ***Bay of Bengal News*** and other publications will be prepared and disseminated. These will serve to inform, enthuse and bind governments and other fisheries stakeholders in the region. Information will also be disseminated through the Organisation's website – *www.bobpigo.org.*

Women in Fisheries

This project will include both desk reviews and field work. It will review the status of women in coastal fishing communities in Bangladesh, Maldives and Sri Lanka, and the effectiveness of projects/interventions carried out so far to help these women. (A review has already been completed for India.) There will be a special focus on improving the livelihood opportunities of these women. Reports based on the reviews will be prepared. A national workshop will discuss the findings of the reviews and formulate an action plan to address issues and problems.

Fisheries Resources Management

This project aims at stemming resource depletion in the coastal waters of member-countries, and at promoting responsible fisheries practices. Elements of the project:

- Assessment of the marine fishing fleet of member-countries. Information will be collected on the status of the fleet and its optimisation *vis-a-vis* resource availability.
- Organisation of a regional consultation on monitoring, control and surveillance. The consultation will improve understanding of needs and methods and options, and lead to regional action plans.
- Preparation of a management plan for one commercial fishery in each member-country.

Several useful suggestions were made at the Governing Council meeting.

They related, for example, to improving the safety of fishermen at sea, strengthening fish stock assessment, reducing post-harvest losses. BOBP has already done commendable work in these areas, and recommendations for action plans already exist.

Funding is of course vital, if the full potential of the BOBP-IGO is to be tapped. The many countries and institutions that supported the BOBP's array of activities during the first three phases, should continue promoting the causes they initiated, in the best interests of sustainable development and management of fisheries in the Bay of Bengal.

– Y S Yadava

Meeting of Heads of Government Cites BOBP-IGO

Six Prime Ministers and a President met recently in Bangkok. This was for the first summit meeting of BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation), held on 31 July 2004. The Prime Ministers were from Bangladesh, Bhutan, India, Myanmar, Nepal and Thailand, the President from Sri Lanka.

One of the few organisations cited by this VVIP meeting was the BOBP-IGO. The leaders agreed that they should strengthen co-operation in promoting the sustainable use of marine resources in the Bay of Bengal. They stressed that management and conservation was necessary, in close coordination with existing frameworks such as the Bay of Bengal Programme Inter-Governmental Organisation, BOBP-IGO.

We welcome the leaders' observations. We will be happy to coordinate with Governments and institutions in the region to promote sustainable management of marine resources.

Balancing the future of fishers with the cost of progress and the benefits of economic gain has been an area of concern for the global fishing industry. And BOBP-IGO is committed to managing change and partnering with stakeholders for a brighter tomorrow.

BOBP-IGO: A Flashback to the Signing Ceremony

Senior representatives of the Governments of Bangladesh, India and Sri Lanka met at Chennai on 26 April 2003 to sign the agreement on the institutionalisation of the Bay of Bengal Programme as an Inter – Governmental Organisation (BOBP-IGO). The Maldivian delegation led by its Minister for Fisheries, Agriculture and Marine Resources visited the BOBP-IGO headquarters at Chennai on 21 May 2003 to sign the Agreement on behalf of the Government of Maldives.

The signing ceremony, held in the Wallajah Banquet Hall of Hotel Taj Connemara, began with the lighting of the ceremonial lamp. Dr Y S Yadava, Interim IGO Coordinator of the Bay of Bengal Programme, welcomed invitees.

Dr Daniel Gustafson, FAO Representative in India & Bhutan, said in his welcome remarks, "This event has been a long time in the making. It is an honour for me to be here and represent the FAO". He thanked member-countries present for ensuring the transformation of BOBP into an IGO.

Representatives of Bangladesh, India and Sri Lanka made brief statements hailing the event.

Inaugurating the meeting, Ms Binoo Sen, Secretary to the Government of India, congratulated the four member-countries for coming together to set up the BOBP-IGO. She noted that the IGO is a co-operative, multi-disciplinary and regional endeavour, the first of its kind in the region. She expressed confidence that it would facilitate important programmes and interventions to benefit small-scale fisheries. She urged other members of the erstwhile BOBP to join the IGO to strengthen it and share its benefits.

Bay of Bengal Programme
Inter-Governmental Organisation
BOBP
Signing Ceremony
26 April 2003, Chennai, India

L-R: Dr Daniel Gustafson, FAO Representative for India and Bhutan; Dr Y S Yadava, Director, BOBP-IGO; Mr Abdul Haque, Secretary, Ministry of Fisheries and Livestock, Bangladesh; Ms Binoo Sen, Secretary, Ministry of Agriculture, India; Mr P K Pattanaik, Joint Secretary (Fisheries), India; Mr G Piyasena, Director-General (Fisheries), Department of Fisheries and Ocean Resources, Sri Lanka; Mr G D Chandrapal, Director (Fisheries), Ministry of Agriculture, India.

Mr Abdul Rasheed Hussain, Hon'ble Minister of Fisheries, Agriculture and Marine Resources, and Mr Ahmed Hafiz, Assistant Director-General (Fisheries), Republic of Maldives, at the BOBP-IGO office for signing the Agreement.

Speakers at the BOBP-IGO Signing Ceremony (clockwise):
Ms Binoo Sen,
Mr P K Pattanaik,
Dr Daniel Gustafson,
Mr Abdul Haque,
Mr G Piyasena.

Headquarters Agreement

The Headquarters Agreement was signed between the Ministry of Agriculture (Department of Animal Husbandry & Dairying), Government of India, and the BOBP-IGO at New Delhi on 14 January 2004. This Agreement relates to the establishment of the headquarters of the BOBP-IGO at Chennai, India and defines its status, privileges, immunities and facilities to be granted by the Government of India and related matters.

Ms Radha Singh, Secretary to the Government of India, presides over the signing of the Headquarters Agreement by Mr P K Pattanaik, Joint Secretary (Fisheries), Government of India, and Dr Y S Yadava, Director, BOBP-IGO.

Mr Abdul Rasheed Hussain, Hon'ble Minister of Fisheries, Agriculture and Marine Resources, Republic of Maldives, accompanied by Mr Ahmed Hafiz, Assistant Director-General (Fisheries), visited Chennai on 21 May 2003 to sign the Agreement. Mr Hussain noted with gratitude the services that BOBP had provided to the region since 1979. He said, "Maldives had benefited from a number of different projects. One of the most successful BOBP projects implemented in the Maldives was the Integrated Reef Resources Management Programme". He had no doubt that under the IGO, equally fruitful collaborations benefiting fishing communities throughout the Bay of Bengal region would result.

The two meetings held for signing the BOBP-IGO Agreement also enabled review of the documents relating to the Rules of Procedure, recruitment of a Director, and activities carried out during the interim period. The activities to be implemented until the first meeting of the IGO's Governing Council were also finalised by delegates.

Bay of Bengal News

This issue of ***Bay of Bengal News*** covers the period April 2003 – August 2004. We are sorry for the long gap - but we were busy with procedures to set up the BOBP-IGO.

-Editor

"The State of World Fisheries and Aquaculture" (SOFIA) is a comprehensive biennial publication brought out by the Fisheries Department of the FAO. Accompanied by a CD-ROM, SOFIA facilitates "a balanced and comprehensive understanding of the fisheries sector, particularly its international aspects". Reproduced here are excerpts from a chapter on small-scale fishing communities in the 2002 edition of SOFIA, which was out last year.

Poverty alleviation in small-scale fishing communities

The issue

While economic growth has helped to reduce the number of poor people in the world, the numbers of those that remain poor is disturbingly high. The positive impacts of growth on poverty have been less than expected, in part because of inequitable distribution of the benefits, population increases, and the effects of the HIV/AIDS epidemic. As a result, there has been a re-focusing on poverty from many governments and donor agencies.

In the past, while many development interventions aimed at reducing poverty, most did not focus explicitly on improving the living conditions of poor people but on accelerating economic growth through technology and infrastructure development, and market-led economic policies. The lack of an explicit focus on poverty may in part explain why many interventions have been neutral in their impacts on poverty, and some may actually have been detrimental. The continued levels of poverty in small-scale fishing communities, and in the world more generally, require all those concerned to take a fresh look at the problem.

THE STATE OF WORLD FISHERIES AND AQUACULTURE
2002
World Fisheries and aquaculture ATLAS

Poverty is a very complex, multi-dimensional concept, has many determinants, and is about much more than just low earnings *i.e.* income poverty. An explicit emphasis on poverty is therefore necessary to better define and understand it, to measure progress towards poverty alleviation targets, and to gain an improved awareness of whom it affects and what strategies can best tackle it.

Poverty in small-scale fishing communities, as in other sectors, is difficult to measure. While there are many studies on poverty in farming communities and the urban poor, there are few empirical studies focussing on fisheries. Those that have been undertaken have often focussed just on income, and on the fishers themselves, rather than on a broader concept of poverty in fishing households and communities.

Oru, a traditional fishing craft of Sri Lanka.

Poor fishers and their dependents are not a homogenous, unchanging group of people. The level of absolute and relative poverty, within and between small-scale fishing communities, varies considerably by area, country, and region.

Although there are poverty traps in fishing communities, over time community members can sometimes become less, rather than more, poor. Fishing communities are often relatively cash-rich, compared to farming communities, mainly because fishers sell a larger proportion of their production, more frequently and consistently than do most farmers. They remain vulnerable to sudden variations in earnings, however. Some factors may be important determinants of poverty but not of vulnerability, and vice versa.

Small-scale fishing communities are vulnerable to many events, the outcome of which may be poverty. Examples: climatic/natural events such as yearly and seasonal fluctuations in fish stock abundance, poor catches, bad weather, and natural disasters such as cyclones and hurricanes; economic factors such as market price fluctuations, and variable access to markets; and the dangers of working at sea. People in small-scale fishing communities may also be vulnerable to poor health and other wider determinants of poverty. Unfortunately, studies suggest that vulnerability is increasing among the poor in small-scale fishing communities.

In developing countries many millions of people live in small-scale fishing communities. Not all small-scale fishers can be assumed to be poor, but a large proportion certainly are, and remain so despite the efforts of donor agencies, national and local governments, NGOs, and the communities themselves. Reasons for continuing poverty include factors within and outside of the fisheries sector: vulnerability as already discussed; insecure access to resources; proneness to resource depletion; the remoteness of many fishing communities; the agro-ecological characteristics of nearby land; their low socio-economic, cultural and political status; a lack of political and financial support (often as a result of an emphasis on semi-industrial and industrial fishing); and competition and conflict with industrial vessels and other economic sectors in coastal areas.

Despite the difficulties of measuring poverty in small-scale fishing communities, and indeed of defining who is a fisher (as fishers farm, and farmers fish) and what is a "fishing community", some crude estimates of the numbers of "income-poor" fishers can be proposed. Global estimates of income-poor small-scale fishers and related employment in marine and inland capture fisheries suggest that 5.8 million, or 20 percent of the world's 29 million fishers, may be small-scale fishers earning less than $1 a day. The income-poor in related upstream and downstream activities e.g. boat-building, marketing and processing, may be as many as 17.3 million. These figures suggest an overall estimate of 23 million income-poor people, plus their household dependents, relying on small-scale fisheries *(See box on page 10).*

Possible solutions

Economic factors are not the only determinants of poverty; there are also social, cultural and political variables. Understanding these determinants is crucial in designing and implementing effective solutions.

The poor can often be difficult to help due to poor health, illiteracy, a lack of time, and a common aversion to risk. Their lack of influence and power is an especially important problem, and necessitates trying to identify win-win solutions that are in the interests not just of the poor, but also of the rich, the elite and the powerful.

The World Bank suggests that "*without economic growth, there can be no long-term poverty reduction*", citing the experience of the last decade. Between 1990 and 1999 those regions of the world with the fastest economic growth made the most gains in reducing the numbers of people living on less than $1 a day. In regions that experienced economic contraction, the numbers of income-poor increased. However, without concerted efforts to re-distribute wealth from economic growth, the gap between the rich and the poor is likely to widen.

Solutions outside of the fisheries sector can be as important, if not more so, than strategies employed within the sector, and may therefore require action and co-ordination across sectors.

Strong economic performance in a country, especially of labour-intensive sectors, is important for small-scale fishing communities because it can create alternative employment opportunities. Diversity and mobility are key livelihood strategies of the poor; improvements in general economic performance and diversification not only offer potential for some fishers to leave fishing, thus benefiting those that remain, but also create a wider range of opportunities and possible strategies to contribute to household livelihoods of those who remain. This appears to have occurred in Malaysia, one of the few developing countries where the number of fishers showed a decreasing trend in the 1990s.

Improvements in general economic performance also provide opportunities to improve health services, education, public service delivery (such as the provision of roads and thus access to markets), governance, political stability, and safety nets, all of which are likely to help with poverty alleviation in small-scale fishing communities. Even where there is little economic growth, there is scope for progress towards poverty alleviation if policy-makers address these issues. An example often cited is that of Kerala in India, where levels of social attainment (education, health, longevity) are high and incidence of poverty is low, despite limited economic growth and low per-capita income.

Solutions within the fisheries sector: As there is little scope for further expansion of capture fisheries given current levels of exploitation, it is crucial to manage fish resources to avoid further resource depletion. Effective and flexible management can improve incomes by limiting entry to the coastal fisheries, avoiding wasteful investments and over-capitalisation, and by supporting sustainable exploitation practices. It can also improve incomes for the poor by effectively protecting small-scale fishers from the activities of large-scale industrial fishing vessels, thereby enlarging the resource base that the poor fishers can exploit.

Shoe dhoni – a fishing boat of Andhra Pradesh that also serves as a home for the fisher family.

There are many different types of fisheries management regimes including unregulated common property (*i.e.* de-facto open access), regulated common property (in which regulation ranges from weak to strong), and management regimes which seek to use private property rights as a management tool. A particular management regime can have a significant influence on poverty; so can the governance framework and institutional arrangements that determine the distribution of wealth. Management regimes must therefore be appropriate for each specific context, and effectively enforced, so as to contribute to poverty alleviation in small-scale fishing communities.

Community management, and perhaps even more so, co-management (the sharing of power and responsibility between the manager e.g. government, and the resource user e.g. small-scale fishers), offer promising solutions to poverty alleviation, although collective action and co-management can require many years of capacity-building before they are effective.

The importance of alternative employment opportunities has already been stressed. Aquaculture is often suggested as an obvious alternative, but although it does have potential, there may be constraints that prevent poor capture fishers moving into aquaculture. Such constraints may include high capital costs, lack of suitable sites, and the lack of access to land and water for the poor. Marine-based eco-tourism, another possible alternative, is generating interest in many countries.

Development assistance has often been found to be particularly effective when it supports women in post-harvest and value-added activities, because they often show a greater desire and ability than men do to save and contribute to enhancing household assets. Given that managerial ability and skill are key determinants of the success of individual fishing operations, interventions that upgrade management and skills and address dynamic entrepreneurship may have an impact on poverty in fishing communities.

Three other important solutions to poverty alleviation within the fisheries sector are worth mentioning.

- Reducing/removing subsidies on production inputs may lead to the use of smaller boats and engines, reduced expenditure on fuel, and increased expenditure on labour. In the long-term, this should increase profits, create more employment and income for poor fishers and reduce debt. The removal of subsidies to large-scale fishing operations and infrastructure would also remove market distortions that often disadvantage small-scale fishers.
- Support must be provided both for *ex-ante* risk management and *ex-post* coping mechanisms that are used to deal with shocks and stresses.
- Support for effective organisations in fishing communities (e.g. co-operatives, political lobbying groups, social support groups) can benefit the poor by increasing access to credit, effecting policy change in favour of the poor, and reducing vulnerability. Such organisations are most beneficial when Governments are supportive and enabling, rather than constraining or restrictive; fishers identify strongly with the aims and motivations of the organisations concerned; and there is able leadership within fishing communities.

Recent actions

Considerable work is now being undertaken to better understand who and where the poor are, why they are poor, and what mechanisms are most effective for poverty reduction. This explains the increasing importance of poverty mapping, development of poverty assessment methodologies, and the emphasis on well-being and capabilities (rather than just income) which focuses on sustainable livelihoods. However, few such analyses have been carried out in fishing communities.

Recent activities outside the fisheries sector include the development of Poverty Reduction Strategy Papers (PRSPs), jointly with the World Bank and the IMF. Although few of these currently focus specifically on fisheries, they should help if fisheries are identified as a key economic sector, or more generally where strategies to reduce poverty are in place and small-scale fishers are poor.

Recent debt relief to Highly Indebted Poor Countries (HIPC), accompanied by efforts to improve health, education and other social services, should also benefit small-scale fishing communities.

Bilateral assistance is focusing increasingly on poverty reduction and food security. Most donors have now put in place strategies and criteria that seek to ensure that their assistance is reaching the poor.

Recent activities within the fisheries sector include those carried out by civil society, donor agencies, and national governments.

NGOs and civil society continue to work with local fishing communities to reduce poverty through credit, re-training and alternative employment creation programmes, and through support for fishing-related and social organisations.

National governments are becoming increasingly involved in

Studies on poverty in fishing communities

The principal findings of a review, indicate that of nearly 300 published and Internet documents on various aspects of poverty in fisheries there are very few studies and analyses on the extent, nature, causes and dynamics of poverty in fishing communities. Similarly, the extent to which the fisheries sector and its various linked activities (e.g. fish processing, marketing and distribution) contribute to poverty alleviation and food security has been subject to limited study. On the other hand, the literature abounds with statements, largely unsupported by empirical evidence, that suggest that fishing communities belong to the poor, or the poorest strata of society. There is also limited understanding of the impact of poverty (incidence, depth and dynamics) on technological change, community and fishers' organizations, and alternative fisheries management governance regimes. On the policy side, the review found that while government programmes (especially donor-supported fisheries development and management programmes) usually seek, at least implicitly, to reduce poverty in fishing communities, these programmes are rarely targeted on the poor.

Macfadyen, G; Corcoran, E
FAO Fisheries Circular. No. 979. Rome, FAO. 2002. 93p.

Chandi boat – a commonly used traditional fishing craft in the estuarine waters of Bangladesh.

co-managing the control of industrial vessels' activities in waters where small-scale fishers operate, and in ensuring fairer international access agreements.

There is also a growing realisation that many small-scale fisheries need to be restructured. The Philippines is implementing a governance model, based on community management systems, with some degree of success; A much broader approach to poverty alleviation in fishing communities is being tried out in 25 West African countries by the Sustainable Fisheries Livelihoods Programme (SFLP), which is funded by the United Kingdom (DFID) and implemented by the FAO.

Outlook

The objective of poverty reduction requires special strategies and targeting.

Given the importance of overall economic performance, the expected expansion in the world economy can be viewed positively; so can an improving balance of external debt in HIPC. But questions remain about whether this overall growth will be sustained, whether it will be reflected in developing countries, whether small-scale fishing communities will benefit, and whether the gap between the rich and the poor can be narrowed.

It is promising that the weaknesses of many conventional centralised fisheries management regimes are increasingly being recognised. There is now a greater awareness of the need for a process approach to fisheries management (accompanied by capacity-building and reform), that is participatory and flexible enough to adapt to changing conditions. Co-management and community-management arrangements offer some potential in this regard.

Greater awareness that good governance (by administrators, politicians, local elites, fishermen and scientists) lies at the heart of many of the solutions to poverty in small-scale fishing communities is vital. However, despite this realisation, improving governance and the institutional capacity to effect meaningful change in the poverty status of small-scale fishing communities is still a formidable challenge; even though it is at least a challenge that is now being embraced.

Global estimates of income-poor small-scale fishers and related employment in marine and inland capture fisheries

Assumptions:

1. Overall figures for the numbers of fishers are based on 1990 FAO data.
2. Marine deep sea fishers and those engaged in aquaculture are excluded, along with all those in North America and Europe.
3. The percentage of total fishers and those engaged in related employment who are estimated to be income-poor is based on the *World Development Report 2000/1* figures for the share of the population in each region in 1998 that was living on less than US$ 1 a day, *i.e.*, it is assumed that the level of poverty in fisheries is the same as it is in other sectors.
4. There are assumed to be three people in related jobs for every one fisher.
5. One hundred per cent of all inland fishers are assumed to be small-scale, while 90 percent of all marine coastal, unidentified marine and unspecified fishers are assumed to be small-scale.

Sources: FAO 1990 data on total number of world fishers and World Bank. 2000.* World Development Report 2000/1, *Washington, DC.

Poverty in small-scale fisheries communities

	Africa	South America	Asia	Oceania	Former USSR	Total
% of population on < US$ 1 a day	46.3	15.6	25.6	11.3	5.1	0
Inland	279 598	2 583	514 023	0	0	796 203
Marine Coastal	112 119	10 148	95 837	458	1 331	219 892
Marine other	112 875	43 867	551 133	13 515	0	721 390
Unspecified	320 733	40 716	3 660 428	0	0	4 021 876
Total	**825 325**	**97 313**	**4 821 421**	**13 972**	**1 331**	**5 759 362**
Number of related income-poor jobs	2 475 974	291 940	14 464 262	41 916	3 993	17 278 087
Total income-poor	**3 301 299**	**389 254**	**19 285 683**	**55 889**	**5 324**	**23 037 449**
World population on < US$ 1 a day						1 198 900 000
% of world population on < US$ 1 a day						1.9%

Source: SOFIA 2002. FAO, Rome

Without outside assistance, poverty in small-scale fisheries can be combated only gradually. Improved governance paradigms and capable management institutions are needed. They will become effective only if public resources are provided, at least at an initial stage.

Alaska hosts the Second International Fishing Industry Safety & Health Conference (IFISH II)

Sitka, the historic city of Alaska (and also its capital during Russian governance of Alaska) hosted the Second International Fishing Industry Safety & Health Conference from 22 to 24 September 2003. The Conference drew experts from around the world to discuss the latest developments in commercial fishing safety and injury prevention – including safety promotion, occupational health, injury prevention, and public safety. The National Institute for Occupational Health and Safety, USA, Alaska Marine Safety Education Association and Alaska Sea Grant College Program sponsored the Conference. The FAO, Rome supported the participation of BOBP-IGO and of some delegates from developing countries.

IFISH I, held in Woods Hole, Massachusetts, USA, in October 2000, explored strategies to prevent fishermen from being injured or killed on the job through measures such as improving vessel stability and hull integrity; making safety equipment like survival suits and life rafts more universally available; furthering education and training; implementing safer management regimes; heeding weather information; averting falls overboard; and addressing industrial safety problems that exist on board many fishing vessels.

Building on the foundation of the first Conference, IFISH II brought together experts interested in all aspects of fishing safety from around the world, in order to raise consciousness, build coalitions, disseminate information, and encourage action to prevent injury in the commercial fishing industry. It also placed special emphasis on papers and presentations describing programs, coalitions, and interventions with proven success in reducing risk to commercial fishermen. During the three-day long sessions, more than 40 fishing industry safety experts from around the world presented their research, observations and injury prevention strategies, covering the following topics:

- Industrial/ mechanical hazards on fishing vessels
- Cold hazard and injury, cold-water drowning - treatment, prevention and survival
- Community/ industry-based research and interventions
- Health promotion and interventions
- History of fishing vessel safety
- Vessel stability, hull integrity and safety equipment - success stories and/or needs
- Relationship between fishery management and safety
- Model programs for fishing injury prevention
- Safety management systems on fishing vessels
- Hazards associated with small fishing vessels
- Safety and survival education and training

The papers presented in the Conference will be shortly available in a comprehensive volume now being edited by the National Institute for Occupational Safety and Health, USA.

BOBP-IGO and Safety at Sea

The Bay of Bengal, unlike many other seas, is rough for most parts of the year; cyclones are frequent and come without warning. The monsoon increases the perils of fishing at sea. With the resource getting scarce in coastal waters, artisanal and small-scale fishing vessels are venturing deeper into the sea, risking their lives. Fishing-related deaths are on the increase - more likely the result of economic pressures and human factors such as risk-taking, fatigue, lack of vessel maintenance, stress or simply an attitudinal problem.

Many lives that are lost at sea can be saved if simple safety and communication equipment are kept onboard. The reasons for this human tragedy are all well-known. Regulations governing boat construction, availability of onboard safety and navigation equipment and timely warnings on rough weather are either absent or not strictly enforced. Who is responsible for this? The government, the boat owners or the fishermen? All the three are equally responsible. The case of artisanal and small-scale fisheries is perhaps the most pertinent in terms of promotion of responsible fisheries operations, and the most problematic, because safety regimes are the weakest here.

The ILO and the FAO estimate that 7 per cent of all worker fatalities worldwide occur in the fishing industry, although the industry accounts for less than 1 per cent of the worldwide workforce.

The issues concerning safety at sea can be tackled, but call for firm resolve and sound long-term programmes. BOBP-IGO is committed to creating a safer working environment for artisanal and small-scale fishers, and to carrying forward the Chennai Declaration (*Bay of Bengal News,* Vol. III, Nos. 2&3, June – September 2001).

Revisiting Chinnapalem: The Women Seaweed Collectors Today

The December 1987 issue of Bay of Bengal News ***carried a photo essay headlined "We are hungry only for seaweed". Written by the then editor of*** Bay of Bengal News, ***the essay profiled the women seaweed collectors of Chinnapalem fishing village in Tamil Nadu in words and pictures. Gitanjali Chaturvedi recently visited Chinnapalem – 16 years after the BBN story. She describes what she saw and heard.***

A half-smile, a stick-on bindi, a diaphanous saree, underwater goggles – in her sunburnt hands she clutches an enormous chunk of seaweed that trails into the sea from one end… her eyes reflect energy and a lust for adventure… she is one of the women seaweed collectors of Chinnapalem immortalised in print by *Bay of Bengal News* 16 years ago. She and her fellows said "We are hungry only for seaweed," and that was the heading of this evocative cover story.

The story talked about women diving into the sea with their improvised scuba gear and underwater goggles, a bag strung sideways across their shoulders for collecting their harvest of seaweed. After paddling about for three hours, they dump their seaweed into a boat moored on the shore, change into a fresh set of dry sarees, picnic on the beach before rowing to their village half an hour away.

What's the situation some 16 years later? Seaweed collection in Chinnapalem has been seriously curtailed. With the birth of the Gulf of Mannar Biosphere Reserve Forest, officials have

Chinnapalem – 16 years back

The sun is blazing fiercely now. Pleasantries with their friends in Mannali island over, the nine Chinnapalem girls walk to the other side of the island, put on their goggles, strap the forecal bags around their waists and enter the sea. Soon they are in neck-deep water and also in the thick of seaweed territory. They fan out in different directions. They dive, grope around and come up with thick bushy seaweed, which they slip deftly into the forecal bag.

The girls are now animated, like a hunter after prey, as they repeatedly dive and grab the precious paasi as seaweed is known in Tamil. It belongs to one of three varieties – *Gracilaria edulis, Gelidiella acerosa, sargassum.*

"We go out to collect seaweed 10 to 15 days a month," says Maniyayi. " The best period is two days before and four days after full moon and new moon". Reason : the tidal variation during these days makes for easy sea trips.

"On every trip we collect 10 to 15 kg of seaweed. If our collection is consistently poor for four or five days, we go and stay in an island for a few days at a stretch. We take with us rice, chillie powder, tamarind, salt, plus a barrel of fresh water for cooking and drinking. Over a single stay in an island, we can return with a few hundred kilos of seaweed.

– From the Bay of Bengal News , December 1987.

prohibited women from venturing to Krusadai Island, a rich source of seaweed. There is resentment in the village; people are refusing to consider any other livelihood options.

I decide to visit the village, 20 minutes from Pamban on the Rameswaram island. The BOBP had initiated a seaweed cultivation programme here 17 years ago; it is likely the village will articulate its grievances to me. Accompanying me are three members of Mundalmunai village – which is known for a success story in pearl culture.

My friends from Mundalmunai tell me that I will be dealing with a very obstinate bunch of women in Chinnapalem. 'They are adamant about collecting seaweed. They have refused to listen to reason… we suspect it is all politics.'

Chinnapalem is not a prosperous village. It has no source of fresh water, no electricity or public health centres. Vagrants linger about, staring into space. Infants naked save for a single black string tied around their waist, play with pebbles on the mud paths. Speckled hens peck tentatively at huge mounds of refuse. A few women string beads and shells into garlands. A woman with flaking skin and knotted hair sits by the fish, waving mechanically at the flies with a hand-held palmyra fan.

Almost every fishing village has at least three pregnant women, and Chinnapalem is no exception. A few men stutter about, wobbly with the previous night's excesses. Chinnapalem has a high rate of alcohol addiction – a local fisherman with bloodshot eyes directs me to the panchayat hall where a meeting has been organised. A few women are in the process of sweeping the sand out of the rectangular hall with a palmyra broom. Straw mats are dusted and placed on the floor for me to sit on. Some 50 people assemble in a matter of minutes. My interpreter introduces me, saying I'm from the BOBP; they can tell me about their problems, I'm here to help them.

A section of the gathering sniggers. A village elder gets up and addresses the crowd. 'It is all for our benefit. She is not from the Forest Department. She wants to speak with the seaweed-collecting women, so let them speak first…' Some one else butts in, perhaps a politician: 'Let me give you some vital information about our village…It has 350 houses, 50 are made of cement, the rest of thatch… there are 800 adult men, 750 fisherwomen. All the women collect seaweed. They leave at 6 a.m. and return by noon after having collected seaweed for three hours…'

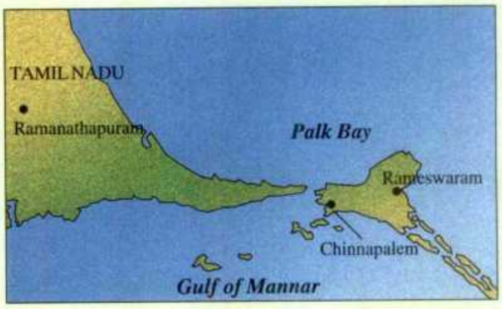
I tell him that I would like to speak with the women… I begin with straight questions. How many boats leave for the island? Do you still have your scuba equipment? Did you see the photographs taken 16 years ago? There is plenty of excitement. Underwater goggles, still wet with seawater, are passed round for us to see. I distribute copies of photographs from BOBP's archives. People are identified; there are squeals of delight, shrieks and gasps as the copies are snatched and passed from one person to the next.

The women speak, and respond sporadically to questions.

- "We collect seaweed some 15 days a month… it isn't a regular activity. We are upset because we can't go to the island anymore."

Seaweed: the Wider Picture

Seaweed is a recognised source of food the world over. Seaweeds like nori and wakame are consumed in abundant quantities in Japan, Korea, China, and Taiwan. Internationally, the seaweed industry is worth anywhere between 6 and 7 billion dollars. It covers a number of seaweed products of both edible and non-edible usage. Some examples: alginates, agar, carrageenan, kelp meal, liquid extracts, nori, wakame, kombu.



Carrageenan, one of the most important products extracted from seaweed, is a hydrocolloid, consisting mainly of the potassium, magnesium, sodium and calcium sulphate esters. It is commonly used as a clarification or gel-forming agent in food processing applications, although its usage in other industries such as dentifrice and pharmaceuticals is also significant.

India harvests approximately 22 000 metric tonnes of various macro-algae annually, against a potential of about 870 000 mt. Most of the seaweed harvested are natural agarophytes and alginophytes that can be used to produce agar-agar and alginates on a smallscale. With about 8 000 km of shoreline, India could be well placed to become one of the world's largest and most competitive producers of *Eucheuma* and value-added carrageenan.

Due to its many geographical advantages, Tamil Nadu can organise a seaweed-based industry capable of creating sustainable alternative livelihoods, particularly for coastal and fishing communities.

- "Earlier, men would mend their nets on the beach, we would collect seaweed and join them and picnic. Now the Forest Department guards harass us if we go there. They even take away our dry clothes and hide them if they see us collecting seaweed."
- Earnings from seaweed collection? "About 50 rupees a day, on the good days." An argument ensues about the earnings. The politician exclaims: "Weren't you collecting between 15 – 20 kg a day? And didn't you get about Rs. 6 a kilo? Doesn't that work out to Rs. 120 a day?" The women retort: "If we really earned that much, you men would have prevented us from collecting seaweed."
- How long have the women been collecting seaweed? "We started doing so regularly only in the 1970s. We collected four different kinds of seaweed that we sold to traders – local traders from Ramnad or traders from Madurai and faraway places." What do the men do? "They are fishermen, but they laze about most of the time… they also mend nets sometimes."
- Wouldn't the women earn more in some alternate activity that occupied them all the time? "When we supplemented the family income with seaweed collection, the household income was about Rs. 1 500… now we just about manage to earn Rs. 1 000."

The politician bridles at this talk. He gets up and waves his arms furiously. He says that since I'm talking about alternative livelihoods, I must be from the Forest Department. "I forbid any of you women to speak with her! You are gullible women… you could fall for anything." He tells me 'If you want to help us out, we are willing to consider fish culture. But we need several acres of land that you must buy in our name… We will of course form a society".

An elderly man rises and implores the gathering to calm down. He says the village must not look at everyone with suspicion, then NGOs which can help them will stay away from the village. Make the best use of your opportunities, he advises.

Chinnapalem women harvesting seaweed.

Bickering breaks out. Abuses fly from all corners. Women shriek, men shout, children bawl. The Panchayat hall resembles a battle field. "Breakdown," my interpreter whispers. I decide to leave. I motion to my friends from Mundalmunai who have now been embroiled in the melee. '*Nandri*!'
I thank the people in Tamil. The meeting breaks up. From the corner of my eye, I see the politician smirk. He's gleeful that the meeting has come to nought.

Are the Chinnapalem fisherfolk justified in their demands? The community stubbornly looks to the sea for resources and employment – it is not their fault. The sea is an integral part of their identity, and the women have got used to earning money from seaweed collection.

I wonder whether the rules of natural resource management applicable to forests in the mainland can be applied to marine ecosystems – which is what I fear the Forest Department is unimaginatively doing in this case. All varieties of seaweed have a life span after which they are swept on the shore. Surely it should be possible to design a management strategy that can allow seaweed to be exploited in a sustainable manner? Over 2 000 people in the Gulf of Mannar depend on seaweed collection as a source of livelihood. The women in Chinnapalem form only a fraction of this number.

But my sympathy for the people of Chinnapalem is guarded. They have been closing all avenues for negotiation. The Forest Department had agreed to allow the women of Chinnapalem to visit Krusadai Island every alternate day until a management strategy could be evolved; the village rejected the proposal outright. All or nothing, they averred.

It can be argued that the people have a right to the resources that they have historically exploited. But at the same time, they also have a duty to preserve the resources. What worries me most is the inability of the Chinnapalem population to accept change. When they are offered options or alternatives, they should seize the opportunity and not waste it. If the obdurate populace at Chinnapalem walks a tightrope between subsistence and survival, aren't they partly responsible?

Fiscal reforms for fisheries:

An International Workshop deals with issues and novel ideas to promote growth, poverty eradication and sustainable management.

An international workshop on fiscal reform for fisheries was conceived and organised by the Support Unit for International Fisheries and Aquatic Research (SIFAR) and subsequently hosted by FAO from 13-15 October 2003 in Rome, Italy. The Workshop brought together 29 participants, from 10 countries and 6 organisations. The primary goal of the Workshop was to exchange of ideas on:

- How to generate maximum value from fishery resources?
- How to ensure efficient revenue collection?
- How best to use fiscal methods to achieve fisheries policy objectives? And also to achieve broader economic, social and environmental objectives?

Mr Grimur Valdimarsson, Director, Fishery Industries Division, FAO, said in his opening remarks that formerly FAO helped fishers to catch more fish; now the focus was on helping countries to reduce fishing effort. He said, "Landings of the 10 most valuable species have declined by 45 percent due to overfishing and reducing effort is proving a difficult challenge. The most promising approach appears to be some kind of system of limited rights coupled with charging for the rights".

Mr Tim Bostock, Coordinator, SIFAR, stressed that an important output expected from the Workshop was the discussion between participants on this important but relatively novel topic. Mrs Nancy Gitonga, Director of Fisheries, Kenya, chaired the first day of the meeting and Dr Y S Yadava, Director, Bay of Bengal Programme, days 2 and 3.

To facilitate exchange of experiences and ideas, the Workshop sessions were organised in a series of phases. Presentations were made by participants of the situation in each country represented at the meeting. Discussions were then organised through thematic sub-groups on the following three themes:

- How to define the mix of fiscal instruments and set the right levels?
- What to do with the resource rent?
- How to manage fiscal reform and negotiate access agreements?

The Workshop came out with the following major recommendations:

- The rationale underlying fisheries management, exploitation and development is beginning to change. Where once the focus was primarily on producing greater quantities of fish, the emphasis is now gradually moving, through concepts such as responsible fishing and sustainable management, towards wealth and revenue generation and their appropriate distribution. This change in focus presents new challenges for fisheries administrations.

Participants at the Workshop.

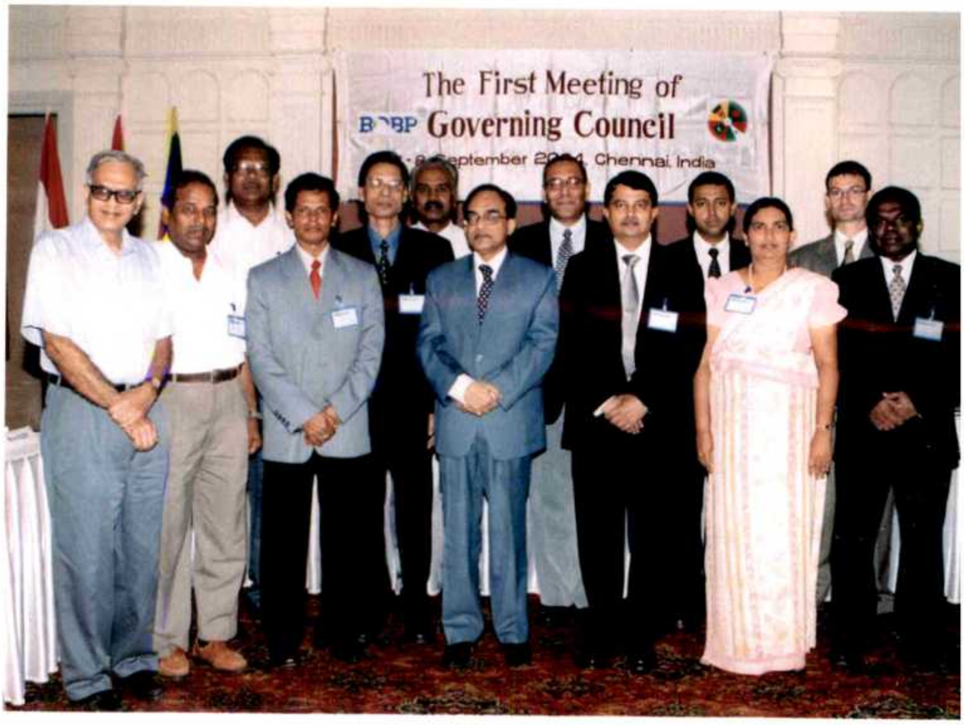
- With the new emphasis on wealth and revenue generation, the issue of resource rent becomes central. Although calculating such rents precisely is a difficult exercise, tools exist to estimate orders of magnitude. Developing and implementing fishery management instruments (such as licences) that allow this value to be revealed in a marketplace will help.
- Where wealth can be generated, choices must be made concerning its distribution. Rent can be left with resource users, or can be extracted by Government on behalf of all citizens. Consideration must be given on how best to use fisheries to meet socio-economic objectives.
- Appropriate fiscal arrangements can also play an important role in fisheries management. First, by helping to control the overall level of effort. Second, by encouraging effort reallocation between fisheries. The challenge is to identify and implement such appropriate arrangements.
- Given the novelty of the approach, which represents a major break with the past, there is a need for extensive communication and discussion of the ideas with all stakeholders.
- In order to achieve fiscal reform, there will be a need to ensure that appropriate institutional arrangements exist and perform well. Capacity will also have to be built up among fisheries managers. Technical assistance in calculating resource rents and in institutional analysis would be of particular interest.
- In order to ensure sustainability, holistic management systems, which integrate all fishing effort, should be developed.
- Where resources are shared on a regional basis, there is a need to ensure effective management and collaboration between partners, including the harmonisation of fiscal arrangements. The Workshop recommended strengthening or establishing regional bodies to play this role.

The full report of the Workshop is available as a FAO Fisheries Circular.

First Meeting of Governing Council Takes BOBP-IGO Forward

The work of the BOBP-IGO came in for generous praise at the first meeting of the Governing Council of the BOBP-IGO, held in Chennai on September 7 and 8, 2004. The Council discussed and approved the IGO's workplans for the current year as well as its report for the previous year, and appointed a director for the IGO for the next three years.

Representatives of the four member-countries (Bangladesh, India, Maldives, Sri Lanka) attended the meeting, besides observers from the FAO and the Network of Aquaculture Centres in Asia-Pacific (NACA).
Mr P M A Hakeem, Secretary to the Government of India, Department of Animal Husbandry and Dairying, Ministry of Agriculture, was in the chair.



Participants at the Governing Council Meeting: left to right, front row: Mr S R Madhu, Dr V S Somavanshi, Mr Fakhrul Islam, Mr P M A Hakeem, Mr P K Pattanaik, Dr Sepalika Jayamanna, Dr Abdulla Naseer. Second row: Mr V S Shegaonkar, Dr M A Mazid, Mr G D Chandrapal, Dr Y S Yadava, Dr K Kapila C K Perera, Dr Simon Funge-Smith.

Dr Y S Yadava, Director *a.i.* of the BOBP-IGO, welcomed the participants and noted that 2004 is a historic year, since it marks a quarter century of the BOBP.
Mr V S Shegaonkar, Secretary for Fisheries, Tamil Nadu, said the Government of Tamil Nadu is proud of its association with the BOBP as host. The State has benefited substantially from the BOBP; he hoped the IGO would continue the Programme's record of service.

Inaugurating the meeting, Mr P M A Hakeem, Secretary to the Government of India, hailed the "significant achievements" of the BOBP. He said "regional cooperation is even more important than international since member-countries of the region share common resources. He described the following programmes as priorities for the BOBP-IGO – resource conservation and implementation of the Code of Conduct for Responsible Fisheries, avoiding discard and wastage of fish, stock assessment programmes, safety of fishermen at sea, and effective communication with fishermen at sea.

After an overview of the status of fisheries in the Bay of Bengal and of issues confronting the sector, Dr Yadava made a presentation of the BOBP-IGO's report for the period June 2003-August 2004. He briefly discussed the IGO's activities (the Code of Conduct for Responsible Fisheries, Women in Fisheries, the Information Service including the IGO website) and described fisheries management as the single most critical issue before member-countries.

Comments on the Report of the BOBP-IGO

Commenting on the report, Dr M A Mazid, Director-General, Bangladesh Fisheries Research Institute, Mymensing, stressed the importance of the BOBP-IGO in organising training and cost-effective study tours. (He said major

Governing Council
7-8 September 2004 Chennai

Lighting the traditional lamp.

Mr P M A Hakeem delivering the inaugural address at the meeting.

training areas included "best management practices", stock assessment and marine pollution). He complimented the IGO on the many workshops it had conducted on the Code of Conduct for Responsible Fisheries. He also suggested preparation of a directory of fisheries experts and institutions in the Bay of Bengal region. The Maldives representative, Dr Abdulla Naseer, Director, Marine Research Centre, Malé praised the publication "Fishes of the Maldives" and said "Such work must go on." He urged that regional fisheries organisations in the BOB region (such as the Indian Ocean Tuna Commission, NACA and the BOBLME) should avoid duplication and work in close association and co-operation with each other.

Dr K Kapila C K Perera, Chairman, National Aquatic Resources Research and Development Agency, Sri Lanka, said that improvements to traditional fisheries, post-harvest technologies and employment generation are some of the areas in which Sri Lanka can benefit from the IGO. Studies on climate and temperature change and their effect on fish production and migration would be useful.

Mr P K Pattanaik, Joint Secretary (Fisheries), Ministry of Agriculture, Government of India, and vice-chairman of the Governing Council, said that the Ministry has looked upon the BOBP as an "Information Bank" that provides revealing inputs. Subjects stressed by India for IGO interventions included: stock assessment, studies on socio-economics and on the livelihoods of traditional fishermen, revalidation of earlier studies concerning small-scale fisheries, harmonization of standards and conventions for traditional fisheries throughout the region, reduction of post-harvest losses.

Dr Simon Funge-Smith, Aquaculture Officer representing FAO, expressed appreciation of the IGO's efforts to raise awareness of the CCRF. He recalled his Organization's "historic relationship" with the BOBP and said the BOBP-IGO was unique in its emphasis on small-scale fisheries; its work would be particularly relevant to the FAO during the next two years, because of a special focus on small-scale fisheries during this period.

In a message, Mr Pedro B Bueno, Director-General of NACA, said the BOBP-IGO joins two other inter-governmental bodies in the region fathered by FAO - INFOFISH and NACA. He said NACA and the IGO could co-operate in several areas such as the Asia-Pacific Marine Fish R &D Network, and the Fish Health Management Program. "NACA will very be happy to come to the table to develop ideas for joint projects or complementary activities. These would provide more and better services to the countries and the region as a whole".

The Governing Council agreed that the following agencies be nominated to the Technical Advisory Committee of the IGO: Bangladesh Fisheries Research Institute, Mymensing, Bangladesh; Fishery Survey of India, Mumbai, India; Marine Research Centre, Malé, Maldives; and the National Aquatic Resources Research & Development Agency, Colombo, Sri Lanka.

Maldives will host the First Meeting of the Technical Advisory Committee in early 2005 and Sri Lanka will host the next Meeting of the Governing Council in November 2005, subject to the confirmation of their respective Governments.

Gazing at the Crystal Ball:

Fish to 2020

The book "Fish to 2020: Supply and Demand in Changing Global Markets" projects likely changes in fisheries over the next two decades, using a global model of supply and demand for food. The book grew out of a 1997 conference in Denmark to define key policy research issues concerning fisheries in developing countries. The book addresses a number of key policy issues such as: Will growth patterns continue for fish demand in the North and South? Where will supply come from? What will happen to trade and fish prices? What are the implications for sustainable use of the oceans and coastal areas? Can aquaculture alleviate the pressure on capture fisheries? What are the implications for the poor? What are the entry points for making the 'Blue Revolution' most favourable to the poor?

The International Food Policy Research Institute (IFPRI) and the Worldfish Center (formerly ICLARM) were the main players behind the conference and the book. Here are some excerpts from the book brought out by Worldfish Center. The book has been authored by Christopher L Delgado, Nikolas Wada, Mark W Rosegrant, Siet Meijer and Mahfuzuddin Ahmed.

The seemingly inexhaustible oceans have proved to be finite after all. Landings of wild fish have levelled off since the mid-1980s, and many stocks are fished so heavily that their future is threatened. And yet the world's appetite for fish has continued to increase. Aquaculture has arrived to meet this increasing demand. Production of fish from aquaculture has exploded in the past 20 years and continues to expand round the world.

But will aquaculture be sufficient to provide affordable fish to the world over the next 20 years? And what environmental and poverty problems will aquaculture face as it expands? Using IFPRI'S International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT), this report projects the likely changes in the fisheries sector over the next two decades, given present trends. Fish prices are expected to rise, reflecting a demand for fish that outpaces the ability of the world to supply it.

The model shows that developing countries will consume and produce a much greater share of the world's fish in the future, and trade in fish commodities will also increase. As aquaculture expands, especially in developing countries, environmental concerns such as effluent pollution, escaped farmed fish, land conversion, and pressure on stocks from fishmeal demand will only increase with time, unless technologies and policies promote sustainable intensification. And small poor producers are at risk of being excluded from rapidly growing export markets unless ways can be found to facilitate affordable certification of food safety and environmentally sound production.

FISH TO 2020
Supply and Demand in Changing Global Markets

Recent trends in fish supply and demand

Since the early 1970s, production, consumption and long-distance trade of fish have risen dramatically, almost entirely because of changes taking place in developing countries. The primary driver of most of these changes has been the increased consumption of fish in developing countries. As population in these countries has grown and consumers have become richer, the resulting increased demand for fish has altered markets for seafood around the world.

China dominates aggregate consumption of fish products. It accounted for about 36 percent of global consumption in 1997, compared with only 11 percent in 1973. India and Southeast Asia together accounted for another 17 percent in 1997, with total consumption doubling since 1973. Total consumption levels have declined in the developed countries since the mid-1980s, mainly as a result of dramatically lower per capita consumption in the former Eastern Bloc countries.

The changing profile of fish consumption around the world comes as no surprise, partly because countries with rapid population growth, rapid income growth and urbanization tend to have the greatest increases in consumption of animal products including fish products.

The shift of wild fish production to developing countries: During the 1970s and 1980s, exploitation of wild fish stocks soared, thanks to expanded fishing fleets, new fishing technologies and increased investments in the fishing sector. Global capture of fish for food jumped from 44 million tons in 1973 to 65 million tons in 1997. By the late 1980s, however, the stocks fished by many wild-fishing operations were fully exploited and even over-exploited. Since then, despite increases in investment and fishing capacity, fish production from wild fisheries has slowed or stagnated.

Developing countries now account for more than 70 percent of the total production of fish for food, including both wild fisheries and aquaculture. By 1997, developing countries were producing twice as much as developed countries. Developing countries have also gone from being net importers of fisheries products to large net exporters over the past 30 years. Part of this shift is due to the establishment of 200-mile Exclusive Economic Zones (EEZs) within which coastal nations can claim exclusive fishing rights, excluding some developed-country fleets and forcing others to strike deals in order to gain fishing access. In some cases, creation of these zones led to the reclassification of fish production from developed to developing countries, as vessels merely changed flags. Meanwhile, developing countries were expanding their own fishing fleets as developed countries were contracting theirs.

One of the most striking trends in the capture of fish for food has been China's emergence as the largest producer and the simultaneous decline of Japan's production. In 1973, Japan was the world's largest producer of wild food fish, accounting for 18 percent of global production. By 1997 its share had plummeted to 7 percent, and its absolute level of production had dropped by nearly half. Enforcement of EEZs significantly reduced the fishery resources available to Japan, and dwindling stocks of fish such as pilchards further reduced Japanese catches. Meanwhile China increased its output from 9 percent to 21percent, boosting production from under 4 million tons to 14 million tons. One study concluded that Chinese fishery production – including aquaculture – was overestimated by 43 percent in 1995, and suggested that institutional incentives that reward or punish local officials

Crisis in developed countries!

In recent decades, capture fisheries in developed countries have entered into a crisis. Global capture fisheries production for human consumption grew through the late 1980s, largely driven by technological improvements that increased capacity, but it has stalled since then. In fact, food fish production from capture fisheries is lower in developed countries than it was 30 years ago, and has declined steadily since the late 1980s. Although some of this decline is attributable to the establishment of 200-mile exclusive economic zones and the resulting reduced fishing access for some developed countries like Japan, overfished and declining stocks are also responsible.

Tuna landings at the Malè fishing market.

based on reported productivity may be largely responsible for the increasing distortion. If China has indeed over-reported its fish production, trends in global fish production appear much less favourable to the health of stocks than they otherwise do.

The rising share of aquaculture

With wild fish production stagnating, growth in overall fish production has come almost entirely from the global boom in aquaculture, especially in developing countries. Aquaculture now represents more than 30 percent of total food fish production, up from just 7 percent in 1973. From 1983 to 1997, developing-country production of fish from aquculture grew at an annual rate of 13.3 percent, whereas production in developed countries grew at a rate of 2.7 percent. Asia accounts for 87 percent of global aquaculture production by weight, and China alone commands a stunning 68 percent share, rising from 32 percent in 1973.

Projections

Global food fish production is projected to total 130 million metric tons in 2020, equivalent to an annual rate of increase of 1.5 percent from 1997 onward (see Table). Of the 37 mmt increase in global food fish production, over two-thirds comes from aquaculture, which is projected to represent 41 percent of global food fish production in 2020 (up from 31 percent in 1997).

Total production of food fish, 1997 and 2020

	Actual 1997		Projected 2020		Projected annual growth rates 1997-2020 (percent)		
	Million metric tons	Share from aquaculture (percent)	Million metric tons	Share from aquaculture (percent)	Capture	Aqua culture	Total
China	33.3	58	53.1	66	1.1	2.6	2.0
Southeast Asia	12.6	18	17.5	29	0.8	3.6	1.4
India	4.8	40	8.0	55	1.0	3.7	2.3
Other South Asia	2.1	23	3.0	39	0.6	4.0	1.7
Latin America	6.4	10	8.8	16	1.1	3.5	1.4
West Asia and North Africa	2.2	9	2.8	16	0.6	3.6	0.9
Sub-Saharan Africa	3.7	1	6.0	2	2.0	5.8	2.1
United States	4.4	10	4.9	16	0.1	2.7	0.5
Japan	5.2	15	5.2	20	-0.3	1.2	0.0
European Union15	5.9	21	6.7	29	0.0	2.1	0.5
Eastern Europe & former Soviet Union	4.9	4	5.0	4	0.1	0.4	0.1
Other developed countries	4.8	12	5.8	20	0.5	2.9	0.8
Developing World	68.0	37	102.5	47	1.0	2.8	1.8
Developing world excluding China	34.6	17	49.4	27	1.0	3.6	1.6
Developed World	25.2	13	27.6	19	0.1	2.1	0.4
World	93.2	31	130.1	41	0.7	2.8	1.5

Source: Actual data were calculated by authors from FAO 2002a; Projections for 2020 are from the baseline scenario of IFPRI'S IMPACT model (July 2002).

Notes: Actual data are three-years averages centered on 1997. Projected growth rates are exponential, compounded annually using three-year averages as endpoints.

The crucial role of technology in the outlook for fisheries

With global fish supply struggling to keep pace with demand over the next 20 years, technology will play a crucial role in determining the prices of food fish both to the poor and to developed-country consumers. In capture fisheries, information technology and waste reduction will be useful in stabilizing production; more intense exploitation is unlikely to yield significant growth on a global scale. Aquaculture has much greater potential for growth, and requires a broader array of technologies not only to increase productivity but also to deal with the attendant problems of intensification. In high-value aquaculture, the possible limiting constraints of fishmeal and fish oil can only be surmounted through feed replacements, and this need will become more important both for aquaculture and the health of fish stocks as aquaculture's demand for fishmeal and fish oil increase.

The introduction of new species and new traits into ecosystems, however, must be regulated and monitored with great caution. As global aquaculture intensifies, technology's role in controlling externalities and minimizing net resource demands will become even more important.

Bay of Bengal News is a quarterly publication of the BOBP-IGO. Readers are invited to send their views and experiences on development of sustainable coastal fisheries in the countries surrounding the Bay. We also solicit scientific/ popular articles on subjects related to coastal fisheries management. The articles should not exceed 4 – 5 typed pages and preferably with good illustrations/ colour photographs. Scientific articles will be subjected to peer review and edited before they are published.

- Editor

Maldivians meet to discuss the Code of Conduct for Responsible Fisheries

Malè hosted a National Workshop on the Implementation of Code of Conduct for Responsible Fisheries during 18 - 19 January 2004. The Workshop was organised by the Ministry of Fisheries, Agriculture and Marine Resources (MOFAMR) of the Government of Maldives in association with the BOBP-IGO, Chennai, and FAO, Rome.

The major objectives of the National Workshop were to facilitate a greater understanding of the Code of Conduct among all those concerned with fisheries in the Maldives; foster steps towards the more effective implementation of the Code in the country; engender a sense of direct participation, thus facilitating a greater commitment to local and national implementation; and identify specific problems and priorities, including those relating to fisheries and management practices as well as to fishery enhancement techniques and the need for diversification.

A total of 67 participants attended the two-day National Workshop. The participants came from the Ministries and concerned offices of the Government of Maldives (38),

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Above: Opening of the National Workshop (seated L – R): Dr Y S Yadava, Mr Ahmed Hafiz, Hon'ble Abdullah Kamaludeen, Mr Jadullah Jameel, Mr Rolf Willmann.

Below: Participants at the Workshop.

BOBP
National Workshop on
Code of Conduct for Responsible Fisheries
18-19 January 2004, Malé, Maldives

the atoll fishermen (6), fish exporters (10), boat builders (2), and school children (11). Mr Rolf Willmann, Senior Fishery Planning Officer, Fisheries Department, represented FAO, Rome. Dr Y S Yadava, Director, and Mr S Jayaraj, Publication Officer, represented the BOBP-IGO.

The National Workshop began with the recitation of the Holy Quran. Mr Ahmed Hafiz, Assistant Director- General, MOFAMR, welcomed the participants and said that a useful starting point to commence the process of national adaptation of the Code is to have a National Workshop. Mr Jadullah Jameel, Executive Director-General, in his opening remarks stressed the need for adaptation of the Code to meet the specific requirements of Maldives. "Popular participation in adapting the Code to suit national conditions may lead to enhanced acceptance of the Code," said Mr Jameel.

Dr Y S Yadava said that implementation of the Code has been one of the core activities of the BOBP, and the Organisation is committed to take the message of the Code to fisherfolk.

Mr Rolf Willmann, Senior Fishery Planning Officer, FAO Rome, said that this Workshop would be a big step in furthering the implementation of the CCRF in Maldives where fisheries plays such a central role.

Inaugurating the National Workshop, the Hon'ble Minister of Fisheries, Agriculture and Marine Resources, Mr Abdullah Kamaludeen, complimented the BOBP-IGO for taking the lead in organising the Workshop.

The Workshop agenda included technical presentations by Mr Ahmed Hafiz ("The Code and its Adaptation for Sustainable Development of Fisheries in Maldives"), Dr Mohamed Shiham Adam, Director, Fisheries Research ("Overview of Fisheries in Maldives"), Mr Mohamed Faiz, Assistant Director, Fisheries Management ("Fisheries Management in Maldives"), Dr Abdulla Naseer, Director, Reef Resources ("Code of Conduct for Responsible Fisheries. What should the Government do to Promote its Implementation?") and Mr Hassan Shakeel, Marine Resource Officer ("Implementing the Code of Conduct: Role of Stakeholders including NGOs and the Private Sector").

A group discussion in progress.

The country presentations were followed by presentations on the FAO's International Plan of Actions (IPOA for the Conservation and Management of Sharks, IPOA for the Management of Fishing Capacity and IPOA to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing).

To enable detailed discussions on critical issues, the participants were divided into four groups: fisheries management and fisheries research; fishing operations, post-harvest practices and trade; aquaculture development; integration of fisheries into coastal area management.

Each Group had three facilitators to assist in the discussions and also prepare a summary of the major recommendations made by the Group. The Group Presentations highlighted the requirements of the fisheries sector in Maldives with respect to the implementation of the Code. A set of valuable recommendations also emerged from the summary presentations made by the Groups.

In the concluding session, Minister Kamaludeen expressed his satisfaction over the outcome of the Workshop. He said that the Code and its technical guidelines should be translated into Dhivehi so that they reach fishermen and other stakeholders at the earliest.

The Report of the National Workshop is under finalisation and will be published in Dhivehi and English.

Congratulations to FAO on a top-class seafood award!

The Fisheries Department of the Food and Agriculture Organization of the United Nations, Rome, received the Swedish Seafood Award for its work with the Code of Conduct for Responsible Fisheries (CCRF) at a ceremony in Gothenburg on 21 October 204. FAO was awarded the prize in the Sustainable Fishing category for its work on the CCRF and Supporting Technical Guidelines. The Award is organised by the trade organisation Svensk Fisk (Swedish Fish), which is run by the Swedish fishing industry. The award also brings with it 300 000 kronor (US $ 41 300), which FAO intends to devote to further strengthen its assistance towards developing countries for the promotion of responsible fisheries.

Indonesian Team Visits BOBP-IGO

INDIA
BAY OF BENGAL
Chennai
SULAWESI
Makassar
OCEAN

It was a flurry of black jackets at BOBP-IGO. The occasion: a team of 12 Indonesians and two Australians paid a 10-day visit from 10 July 2003 to the BOBP-IGO and other institutions in Chennai and Kakinada to acquaint themselves with safety-at-sea projects. The visitors are active participants in the 15-year program COREMAP, which seeks to rehabilitate damaged coral reefs and conserve undamaged reefs in Indonesia. The trip to India was funded by Ausaid.

The 12 Indonesians belonged to the Indonesian Media Center, which has been established to promote resource conservation among coastal dwellers. For the past two years, the Media Center has organised creative and innovative project activities in Makassar, South Sulawesi (see map). Leader of the group was Mr Baharrudin Nur (from the Bureau of Economic Development in Makassar). Three other members were fishers, two of whom were village heads. The remaining members were social activists, trainers, graphic designers and project staff. Some came from remote islands; this trip to Chennai was the first time they had left their homeland.

Last year, after an awareness-raising exercise, the Media Center established a foundation with safety and survival at sea as its focus. Since then the Center has been working with remote communities and introduced some significant innovations. Examples: a vessel with built-in buoyancy chambers; a fibreglass cover for external engines and an enclosure for inboard engines (this prevents morbidity in exposed engine parts). Besides, the foundation has set up data banks detailing accidents and incidents with fishing vessels at sea in order to systematically analyse patterns of morbidity and mortality in Indonesian fishing villages.

The Indonesian team visited the BOBP-IGO office and was given an overview of BOBP's past and current initiatives on sea safety. The team then travelled to Kakinada. (Kakinada was the nucleus of an FAO-assisted project to help fisherfolk and the Department of Fisheries, Andhra Pradesh, to combat frequent cyclones.) For many the trip to Kakinada was very exciting, as it was their first journey on a train.

- The team was briefed on sea safety and preparedness programmes by Mr C M Muralidharan, senior specialist of AFPRO (Action for Food Production) and officials of the State Institute of Fisheries Technology. Mr V Babu Rao, a boat building engineer who has specialised in construction of fibreglass boats, and Mr S B Sarma (former Assistant Director of Fisheries who was earlier BOBP's coordinator based in Kakinada) gave the visitors talks and demonstrations on engine/ motor repairs and maintenance, occupational hazards in respect of engines/ motors, training in safety and best-use practices.
- The team met the Joint Director of Fisheries (Coast), and discussed shore-to-sea communication systems and satellite weather forecasting systems installed in the state.
- The team visited the Kakinada fishing harbour, where members acquainted themselves with shore-to-sea communication systems onboard fishing craft. They interacted with artisanal

The Indonesian Team at BOBP-IGO office. Sitting L – R: Andi Israhuddin, Abdul Salam, Andi Muhammad Riady, Melody Kemp, Sugiartanty, Ahmad Mauliddin. Standing L – R: Robert Kingham, Abdul Razak, Anis Tejakusuma, Nurung Abdul Muin, Hamzah Baso, Baharuddin Nur, Y S Yadava, Mus Arifin, Ahmad Latta.

boat owners on traditional sea safety mechanisms.

- The team visited the Integrated Coastal Management project in Kakinada, and learned about initiatives taken by NGOs concerning sea safety and disaster preparedness. Mr N Harikrishna of Oxfam, Hyderabad, and others gave the team a briefing.
- On return to Chennai, the team attended a lecture by SIFFS (South Indian Federation of Fishermen Societies), Trivandrum, on safe use of outboard motors in small fishing crafts.

"We were impressed by what we saw, particularly the fibreglass technology with flotation devices. Mr Babu Rao demonstrated these in Kakinada," said team leader Baharuddin Nur. All the members praised the community organisation efforts in Kakinada to prevent or combat cyclones. "Indonesia is not subject to cyclones. But we are vulnerable to earthquakes and tsunamis, so we need emergency plans," one of them said.

Indonesia hasn't joined the BOBP-IGO yet, but the team from Makassar acknowledged the importance of regional co-operation, and will keep itself informed about the IGO, its ideas and activities. In the immediate future, it hopes to benefit from Mr Babu Rao's expertise in fibreglass technology and mechanical maintenance.

The visitors said they were taking back from India knowledge and awareness of how problems similar to their own can be effectively tackled. They had gained in confidence as well. The men in black jackets left India with suitcases that bulged with glistening Indian fabrics, and proceeded to Sri Lanka to spend a week with the National Fishers Solidarity Organisation (NAFSO).

Interactions with the community (above) and demonstration of a fibre-glass safety float at the boat building yard in Kakinada, Andhra Pradesh (below).

COREMAP, Safety at Sea and BOBP

The health and safety of fishers is related to the health and safety of marine ecosystems. The "types of thinking and the notions of consequence" that would help fishers to survive would also help reefs and marine ecosystems. That is the rationale behind the visit of the COREMAP team to the Bay of Bengal region.

It was believed that by travelling to India and seeing and listening to fishers who were part of a Safety-at-Sea (SAS) programme, the Indonesian teams could broaden and enrich their knowledge and learn to independently develop and monitor SAS activities. The fact that small-scale fisherfolk in the Bay of Bengal region use an infrastructure and face problems comparable to those in Indonesia, made the India trip all the more useful.

BOBP's materials relating to safety and survival at sea have been enthusiastically received, particularly by World Bank consultants designing Phase 2 of COREMAP. They would like to incorporate these materials in a Reef Watcher Manual.

The visitors' itinerary, prepared in consultation with BOBP's Dr. Yadava, called for trips to field sites which had developed organisational structures for SAS of small-scale fishers. The Indonesian participants were carefully selected to include trainees from SAS workshops already conducted such as village safety officers, reef watchers, field facilitators, NGO personnel – plus staff of the Media Centre in Makassar.

The IGO Spotlights Women in Fisheries

Glimpses into two useful publications brought out recently by the BOBP-IGO: a review of women in fisheries on India's east coast, and a manual on self-help groups, both authored by Gitanjali Chaturvedi.

In 1980, a delegate to a BOBP workshop said that "Women in fisheries" was "an area of darkness" because little reliable information was available on the subject. There were few factual reports, very little documentation. Interventions had to be based on conjecture and guesswork.

The picture is now dramatically different. The "area of darkness" has been brightly and boldly illuminated by the BOBP. Between 1979 and 2003, the Programme brought out 13 publications on women in fisheries – reports of workshops, investigations and pilot activities carried out in member-countries. Plus a few score articles in the newsletter *Bay of Bengal News.* The BOBP-IGO has now added two worthy publications to this list.

'Women in Fisheries on the East Coast of India: A Review"

Between October 2003 and March 2004, the IGO carried out a review of women in fisheries in coastal areas of Tamil Nadu, Pondicherry, Andhra Pradesh, Orissa and West Bengal.

A combination of desk study and field work, the review resulted in an 88-page booklet. It contains a 20-page overview on the status of women and of interventions made by BOBP and other organisations; a 36-page report on what's happening in selected villages and what some NGOs are doing for women in fisheries (based on field visits to 30 villages); 16 pages of annexures and tables, which include a questionnaire for NGOs and a "checklist for project sites"; and a glossary.

Some glimpses into the booklet: facts, quotes, revelations, nuggets of information:

Working Together
A Manual on Self Help Groups
Women in Fisheries on the East Coast of India
A Review

- In several fishing villages of India's east coast, women's role in marketing and processing fish has been diminished in recent years by the advent of middlemen and resource depletion. Women have not been dynamic enough to take up other occupations.
- What were BOBP's main interventions concerning women? Training fisherwomen of Tamil Nadu to act as links between their villages and the outside world; expansion of the link worker scheme; improving credit facilities; organising an exclusive fish market for women fish vendors of Besant Nagar, Chennai; promoting post-harvest facilities (ice boxes to preserve fish; new and better fish containers for fish vendors; fish drying racks and smoking bins); several socio-economic studies.

  Further, several BOBP activities aimed at fishing communities in general (such as introduction of beachcraft, extension training, non-formal education) helped women as well.
- Self-help groups (SHGs) have become the new ***mantra*** for social and economic uplift in fishing villages. They have replaced co-operatives which

> ***"I am pleased to note that these two publications contain valuable information and once more confirm the long-standing determination of BOBP to improve the living conditions in fishing communities and in particular, that of women."***
>
> ***– Dr Jacques Diouf, Director-General, FAO, Rome.***

Cleaning the fish before drying – fisherwomen of Kakinada, Andhra Pradesh.

have become increasingly corrupt. However, SHGs have developed as micro-savings institutions; they have not succeeded in channelling savings into income-generating activities. Reason: the risks of individual enterprise scare women; marketing of finished products is a challenge too. An exception: In Tuticorin, Tamil Nadu, self-help groups in Vellapatty village have helped women to start and run businesses such as petty shops, fish pickle units, crab fattening.

- In 1992, NABARD (National Bank for Agriculture and Rural Development) launched a programme to link SHGs with banks.

  266 banks are part of the SHG network and link 7.8 million families.

  90 per cent of SHG members are women; 66 per cent of the SHGs are in the southern districts of Tamil Nadu and Andhra Pradesh; the repayment rate of loans to SHGs is 95 per cent; Punnakkayal, Tamil Nadu, has the largest number of SHGs in an Indian village (50).
- "Empowering fisherwomen is a multi-pronged exercise of inculcating awareness, finding income alternatives, assuring livelihood security."
- What are the non-fisheries livelihoods open to fisherwomen? Agriculture (in many areas of the east coast); tailoring and allied services (fisherwomen in Rameswaram, Tamil Nadu; Nallavadu village, Pondicherry, Bheemunipatnam, Andhra Pradesh, have been trained in tailoring, but need help to start businesses); salt pans (Tuticorin); shell collection and shell craft (Rameswaram); palmyra craft (Keelakarai, Tamil Nadu); shrimp farms (Andhra Pradesh); labour for construction sites and cashew plantations (Telugu-speaking women in Orissa); animal husbandry and pisciculture (West Bengal); growing medicinal plants and herbs (Veerampattinam village, coastal Pondicherry); handicrafts (opportunities for business in shell craft and palmyra leaf craft exist throughout the coast. Fisherfolk could supply shells to factories that require lime.)

Interactive sessions help in identifying activities that can sustain the SHGs.

- What about livelihood opportunities in coastal or marine ecotourism? Tamil Nadu has some beautiful churches and forts in coastal areas. Pulicat lake is a bird sanctuary; Pulicat town has some beautiful Dutch relics; The Gulf of Mannar sports religious, educational, leisure and adventure tourism features; Pondicherry has a world-famous ashram which draws people who want an alternate lifestyle; the Orissa coast is dotted with tourist attractions such as Gopalpur-on-Sea, Chilka lake, Konarak and Puri. The Sundarbans in West Bengal is a tourist attraction. But most opportunities offered by the tourist industry are grabbed by resorts, multinational companies and the local elite.

The author suggests that SHGs be organised among fishing communities. They could cater to tourists by offering beach shacks and restaurants, public call centres (STD booths) and boat rides for tourists. In Goa, Kerala and Sri Lanka, fishing communities are active in the tourism industry. This phenomenon should be studied.

Women from east coast fishing communities could play an important role in tapping the benefits of ecotourism if given proper training.

Women's fish market in Besant Nagar – an enterprise that failed to sustain.

The author notes that Government institutions such as the Central Marine Fisheries Research Institute (CMFRI), Kochi, and the College of Fisheries, Tuticorin, train fisherwomen to prepare value-added fisheries products. In the Gulf of Mannar, institutions like the M S Swaminathan Research Foundation (MSSRF) and CMFRI teach pearl culture. In Pondicherry, women have been trained in ornamental fish culture. But such training can't be converted to cash in the absence of management and marketing skills. "Teaching skills that do not generate income will only serve to dampen enthusiasm and increase the dependence of fisherfolk on the government."

- NGOs working with fisherwomen have generated awareness on domestic violence, alcoholism and gender rights; they have helped with capacity building, leadership training and occupational training; they have formed SHGs to promote savings and credit; they have organised programmes on literacy, health awareness, sanitation and hygiene.
- The booklet provides information about selected fishing villages on the east coast, women's activities and NGOs assisting them. It also reproduces a questionnaire for NGOs that seeks basic information about the background, achievements and contact details of the NGO, its perception of the problems and needs of coastal communities, and the kind of skills it can impart to them. The BOBP-IGO has a database of 40 NGOs that have answered the questionnaire.

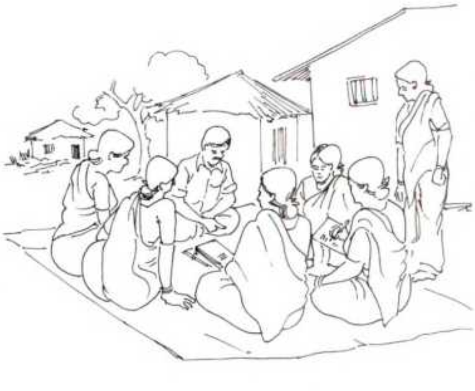
Growing SHGs....

- The booklet contains a 10-page checklist for factual data about project sites on the east coast. A database has been organised about a number of project sites on the basis of information provided through the checklist.

Make the SHGs market-savvy!

The SHG movement has effectively transformed the lives of rural women in many parts of the country. However, the weaknesses that have emerged in the overall growth of the SHGs need to be addressed to sustain the movement and empower rural women in a true sense. SHGs lack the skills to penetrate the market; they have been so far hovering on the periphery. Efforts are required to make them market-savvy, and build up functional linkages between SHGs and the growing market.

– Editor



Working Together: A Manual on Self-Help Groups

This slim and attractively illustrated little publication answers basic questions about SHGs, narrates a few success stories, describes how an SHG is set up and contains an interactive guide for social workers and facilitators. It also contains a useful directory of organisations concerned with SHG formation.

The manual notes that SHGs have been extremely useful in enabling rural credit, but have yet to impact the rural grassroots because they have been inactive in skill development or market orientation.

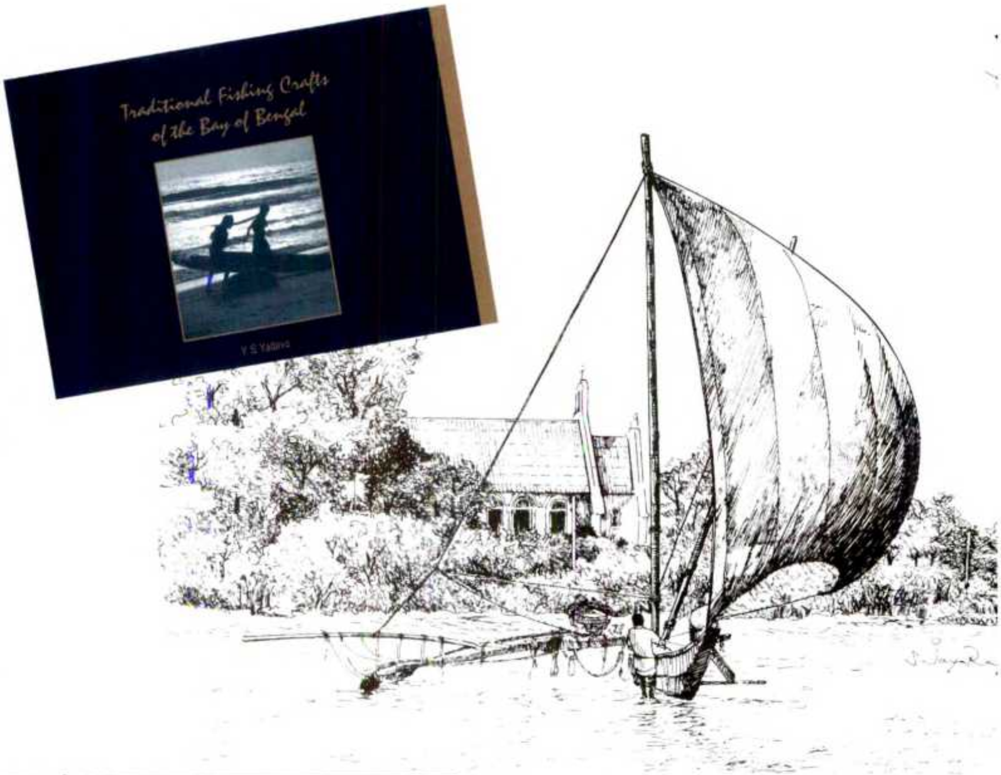
Some SHG success stories:

- Women in a remote Karnataka village run a successful courier service, after investing in a few scooters.
- In Thirukanchipet, Pondicherry, a Dalit community SHG has invested in a 16-seat autorickshaw that is a boon since public transport facilities are 5 km away. The UNDP, the District Rural Development Agency (DRDA) and MSSRF helped out with money for the vehicle. The autorickshaw makes 70 trips a day and runs on a battery.
- In Rameswaram island, Tamil Nadu, a group of physically challenged people run a centre (Nesakarangal) that imparts training in shell and palmyra leaf craft to people with similar disabilities.
- An SHG of 16 women in Gadimoga village, East Godavari district, Andhra Pradesh, provides mid-day meals to the village school.
- Two women's SHGs in 24 Parganas district, West Bengal, successfully breed and market fish and prawns, and improve sanitation by constructing and maintaining low-cost latrines.

— S R Madhu

Traditional Fishing Crafts of the Bay of Bengal

by Y S Yadava


Traditional Fishing Crafts of the Bay of Bengal
Y S Yadava

This splendidly pictorial booklet, which records and describes the traditional fishing craft of the Bay of Bengal, is 60 pages of sheer enchantment. It is packed with facts, statistics and quotes about traditional fishing craft from India, Bangladesh, Maldives Sri Lanka, Indonesia and Thailand; but its charm lies in the 40-odd photographs and a few sketches.

The log kattumarams, raft kattumarams and boat kattumarams of Tamil Nadu; the navas and shoe dhonis of Andhra Pradesh; the sabada and chhoat of Orissa; the chandi of Bangladesh; traditional boats from Thailand; the canoes of Indonesia; the beautiful oru of Sri Lanka; the teppam of Sri Lanka; the dhoni of the Maldives – what are their distinctive features? What are their pluses and minuses?
As Dr M S Swaminathan says in the booklet's foreword, "I am impressed by several obvious characteristics of the traditional crafts – their simplicity, their beauty, their compactness. I can well believe that some of these crafts are perfect for their users, the artisanal fishermen who operate in the inshore waters of the Bay of Bengal."

The choice of the black-and-white medium for photographs of traditional craft is apt. If colour photographs reflect the life of a subject, it's black-and-white that captures its soul, as Henri Cartier-Bresson demonstrated many years ago. This publication, of course, can't boast of any picture by that great master, but it does have some memorable photographs by Harry Miller — many of them shot in 1979, the year BOBP was launched. "Austere, yet beautiful" to quote Dr Swaminathan again, the photographs "capture not merely the small-scale fishing craft but also the lives of small-scale fishermen: full of peril, full of challenge and adventure, full of meaning."

Traditional Fisheries Management Systems in Six Provinces of Indonesia

by Sihar Siregar, Reza Shah Pehlevi, Riyanto Basuki.

Fisheries management was the mandate of the BOBP's third phase. Diverse activities and approaches to management were tried out in member-countries. In Indonesia, it was considered useful to study the experiences and practices of customary fishing rights systems, and obtain learnings and lessons that could be applied to community resource management today.

This report documents case studies of traditional or customary fisheries management systems from six provinces of Indonesia – North Sumatra, West Sumatra, Aceh, Jambi, South Sumatra and Riau. The Directorate-General of Fisheries, Indonesia, organised the exercise in collaboration with national institutions and the Provincial

Fisheries Service of South Sumatra province.

The three authors who put the case studies together adopted a three-fold approach: they reviewed and synthesised existing literature; conducted a number of interviews with fisherfolk communities; and carried out a two-month field survey in the six provinces.

The concepts contained in the traditional management systems were straight-forward in their simplicity. For example, a leader "should be clean"; he should be honest; he shouldn't go back on his word. No killing, no stealing, no poisoning, no sexual intercourse before marriage. Rules for fishing in common property areas were clear, and penalties were spelled out. The rules and penalties were apparently enforced, because compliance was high.

"There's much that modern fisheries managers can learn from these traditional systems," says the book's foreword.

Coming Together to Manage Fisheries:

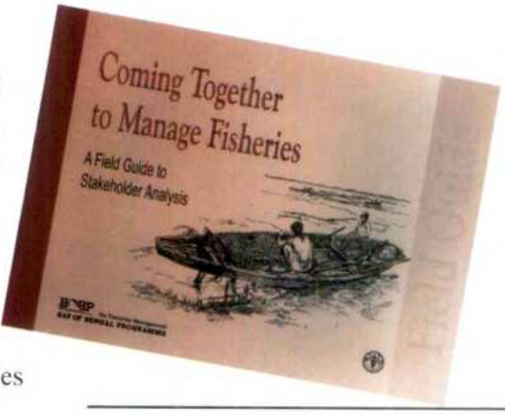
A Field Guide to Stakeholder Analysis

by R N Roy

If several people have a stake in a project, a property or a proposal, they should organise and manage it together. It's difficult to dispute the wisdom or common sense behind this statement. But in fisheries, few things are regarded as more difficult than management by all stakeholders.

This little 68-page booklet, a "field guide to stakeholder analysis" therefore meets a serious need. Well-illustrated with sketches and diagrams by S Jayaraj, the booklet is based on the BOBP's experiences in fisheries management. A Prologue points out: "The stakeholder approach described in this guide is more an approach to managing those involved in fisheries than managing the fisheries."

This field guide is regarded as useful to fishery extension and technical staff, representatives of NGOs working in fisheries, members of fisher co-operatives, people working with communities, anyone interested in enabling communities to better manage the resources they depend on.


Coming Together to Manage Fisheries
A Field Guide to Stakeholder Analysis
BOBP
BAY OF BENGAL PROGRAMME

It is believed that the guide enables the reader to understand the problems faced in managing small-scale fisheries; it proposes stakeholder approaches that may overcome the problems; it defines a stakeholder and proposes methods of identifying stakeholders of a fishery; it suggests methods of undertaking stakeholder analyses; it suggests ways and means of bringing stakeholders to the table; it proposes the way forward, including stakeholders agreeing on problems; it raises issues and concerns that may confront stakeholder approaches to fisheries management.

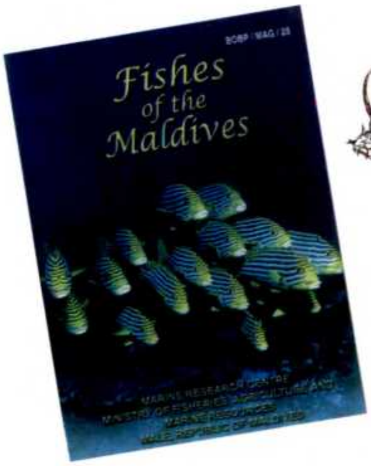
The field guide makes it clear that "more explorations need to be made" to refine the maps and tools of the methodologies advocated in the book.

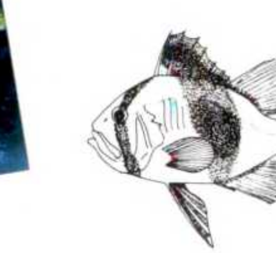
Fishes of the Maldives

This massive 450-page book, in English and Dhivehi, identifies and describes as many as 370 fish species of the Maldives, with sketches, English and local names and some brief technical description. It has been organised by the Marine Research Centre in the Ministry of Fisheries, Agriculture and Marine Resources, Male, and printed by the BOBP.

The book was first published in 1997; this second edition was published in 2003. The book will be found useful by students of fisheries science, and by everyone who needs to identify commercial fish species. A major aim of the book is to present information in Dhivehi to local populations who do not have access to specialised literature.

One of the highlights of the book is the Preface by the President of Maldives himself, His Excellency Maumoon Abdul Gayyoom. Written in Dhivehi, the Preface reflects the profound interest of the President in the fisheries of the Maldives, and in this book in particular.





Asia-Pacific Countries Meet in Thailand to Decide a New Role for APFIC

Representatives of 15 member–countries and 10 Regional Organisations met at Chiang Mai, Thailand, during 3-5 August 2004. The occasion was the Twenty-Eighth Session of the Asia-Pacific Fishery Commission (APFIC). The agenda included an overview of the status and potential of fisheries and aquaculture in Asia and the Pacific; APFIC's potential as a consultative forum for fishery issues; regional arrangements for fisheries – an analysis of gaps and opportunities; and APFIC's work plan for 2004-2010.
Dr. Y S Yadava represented BOBP-IGO at the session.

Inaugurating the Session, Mr Sitdhi Boonyaratpalin, Director-General of the Department of Fisheries, Thailand said the decline in capture fisheries production in many coastal fisheries in the region was alarming. He urged effective action to address management needs in small-scale fisheries.

Dr Derek Staples, Secretary, AFPIC (and Senior Fishery Officer, RAP-FAO, Bangkok) presented an overview of the status and potential of fisheries and aquaculture in Asia and the Pacific. He said the Asia-Pacific region continued to be the largest producer of fish and fishery products in the world, with 92 millions tonnes or approximately 69 percent of global production in 2002. He also said that despite the significance of fisheries and aquaculture in the region, this sector is often overlooked in national policy development and given less priority than other agriculture production sectors.

The Commission agreed that a more holistic approach to fishery management was needed that balanced the needs of different parts of the fishery sector, and also balanced human well-being against ecological well-being.

Making an important decision on the future role of APFIC, the Commission unanimously agreed that APFIC should function as a Regional Consultative Forum (RCF). It should provide a framework for members to discuss fisheries issues which affect groups of States across the wider Asia-Pacific region and to formulate recommendations for action. APFIC could act as a platform to discuss emerging issues relating to fisheries, trade and sustainable management facing its members. In its work plan for 2004-2010, the Commission agreed to hold two regional consultative workshops possibly in 2005 –one on "Trash fish and discards in the Asia-Pacific region ", and the other on "Coastal and inland fishery co-management in the Asia-Pacific region".

What is APFIC?

The Asia- Pacific Fishery Commission was established in 1948 as Indo-Pacific Fisheries Council (IPFC). The name changed to Indo-Pacific Fishery Commission in 1976, and its present name in 1994. Set up under the aegis of FAO (Article XIV of FAO Constitution), the Commission works from the FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. The Commission covers the Indo-Pacific area (including inland waters). The members are Australia, Bangladesh, Cambodia, China PRC, France, India, Indonesia, Japan, Korea RO, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand, UK, USA and Viet Nam. The Commission is mandated to "promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations and by the development of related processing and marketing activities in conformity with the objectives of its members".

The Session also saw the release of a CD archiving the reports and technical papers of past sessions of APFIC, the launching of the APFIC website (www.apfic.fao.org) and a handbook on "Regional fishery bodies and arrangements in Asia and the Pacific (RAP Publication: 2004/12)".

The Commission agreed to hold its 29th session in August 2006. Malaysia and Indonesia were unanimously elected Chairperson and Vice-Chairperson of the Commission respectively. The Republic of Korea, India and Thailand were unanimously elected to serve as members of the Executive Committee. The full report of the session is available from the FAO Regional Office for Asia and the Pacific, Bangkok (RAP Publication 2004/19)

– Editor

The Vernon I Knew

by Lars Engvall

BOBP's first Director pays a moving tribute to Vernon Pietersz – who served as Fisheries Secretary of Sri Lanka, as BOBP's first Development Adviser and as FAO's Regional Fishery Adviser in Bangkok. Vernon passed away in Bangkok on August 30, 2004.

Mr Vernon Pietersz (1929–2004)

My association with Vernon dates back to 1975, when he was Director of Planning in the Ministry of Fisheries in Sri Lanka and I was Project Manager of a FAO regional fisheries project headquartered in Colombo.

Vernon was a first-class fisheries bureaucrat. He never accepted anything at face value. He always did his homework before any decision or action. A fisheries generalist with wide general knowledge, he took great pains to cope with any specialist subject.

He was never voluble: a listener rather than a talker. But when he did speak, it was the voice of reason, of confidence, of authority. Tact and diplomacy were his watchwords. He had a great flair for conveying a negative decision or outcome in a pleasant manner, without offending the person concerned. Result: his decision was immediately accepted.

In the early days of BOBP, Vernon was an invaluable manager. As officer-in-charge during my absence on duty travel, he always took the same action as I would have done myself. The only difference was that he did it better.

Vernon had a rare command of the English language. He often sat late in the office to help refine an important report or a confidential presentation. While ordering another new safari suit on a visit to Bangkok, he advised a leading tailor there to correct the English in his advertisements.

Vernon was warm-hearted as friend, colleague or boss. He was a source of sage advice to the many young "Associate Experts" from Europe who came to Chennai and BOBP, helping them adjust to their new environment.

His integrity was unimpeachable; his quiet manner was always appreciated; his wit and sense of humour clinched many an argument and won him many a friend. I'll miss him.

A Diplomat to the Core

by S R Madhu

His full name was Vernon Lionel Constantine Pietersz, but his middle name was "diplomat". In the early and middle 1980s, BOBP was often in ferment. The 40-odd people in its Chennai office apparently touched people a hundred times that number in many countries. Days were long and tempers short. VLCP was an ace problem-shooter. Sometimes one saw a staffer charging into his office, nostrils afire – and 10 minutes later the same person stepped out gingerly, looking sheepish and abashed. Vernon's reasonableness rubbed off on every one.

"Your Customs people at the airport are very nice," Pietersz once told me. "Not many people say that," I responded truthfully. He said: "The young man at the Customs looked at my passport and said 'You were Secretary of Fisheries in Sri Lanka, I'm sorry I can't stand up while talking to you because I have an injured knee'." Only someone special inspires that kind of respect among the Customs staff at airports.

I was a personal witness to the respect that Festus Perera, then Minister for Fisheries, accorded him. Festus told him in detail about a new policy he had in mind, and asked anxiously, "Am I doing right, Vernon?" "Very right," said Vernon reassuringly, but added many reservations. I'm sure that resulted in a better policy.

He was soft-spoken, but he urged speakers at workshops to be loud and clear. "Maybe it's a cultural trait but often we speak too soft. Please speak up." He was the ideal workshop rapporteur because he combined fisheries competence with proficiency in English.

He was a good writer too, concise and precise, with a rare ability to convert masses of technical data into crystal-clear statements. I still remember his article in ***Bay of Bengal News*** assessing the impact of BOBP's aquaculture project in Phang Nga, five years after the project. Or his technical paper summarizing 15 years of BOBP work on beachcraft development.

Says Arne Andreasson, who succeeded Vernon as Development Adviser at BOBP: "Vernon was the leader on my first mission to Bangladesh in 1977. He taught me a lot about fisheries and fisheries administrations in South Asia. When we were writing up a report on small-scale fisheries in Bangladesh more than 25 years ago, he virtually rewrote every sentence. A very frustrating experience. But what a learning process on fisheries, diplomacy and report writing!

"Many years later (early 1990s), we were together again, this time producing a workshop report. I handed my draft to Vernon, expecting it to be slaughtered. I was surprised that there were almost no corrections. I asked: "Vernon, what is wrong, are you getting old?" The typical Vernon reply: "No, but I believe your writing has improved a bit over the years".

Says Uwe Tietze, a senior fisheries officer in FAO Rome: "I remember Vernon as a person with a deep sense of humour. On one occasion I was invited to his house for dinner. He showed his guests around and talked about his new antenna dish on the roof terrace with which he could see Sri Lanka. One of the guests wanted to be shown the terrace. Vernon took us there. The guest: "From where can I see Sri Lanka?" Vernon: "Not from here, from downstairs in the living room on TV."

Says Rolf Willmann, now a senior planner in FAO Rome, "Way back in 1979, one of the little problems of daily life was getting pure unadulterated milk. The bicycle boys often supplied milk diluted with water of varied origin and quality. Vernon and his wife got a farmer to come home every morning with his cow, where she was milked under the supervision of his house-helper! "As a young professional I have greatly benefited from Vernon's guidance in many ways but I remember this practical lesson very well."

Dr Armin Lindquist, formerly Assistant Director-General of Fisheries at FAO, Rome, describes Mr Pietersz as a "dedicated officer" whose knowledge and competence helped in better understanding and implementation of FAO policies.

Some Personal Insights from a Close Friend

by K Sivasubramaniam

Vernon Pietersz was born on the 11th of March 1929, in Wennapuwa, and had a brother and two sisters. His college education was in Wennapuwa, Katugastota and Peradeniya University, from where he obtained an honours degree in history in 1951.

He joined the Fisheries Department in 1955 as an Assistant Director, and rose to the position of Director, Planning and Programming. His contribution to development schemes such as motorisation of fishing craft, introduction of synthetic materials, fabrication of fishing gear or establishment of training schools for youth from coastal communities, was immense. Hailing from a coastal area, he had an inherent interest in the well-being of coastal communities. He was appointed Secretary to the Ministry of Fisheries in 1977 and retired from government service towards the end of 1978.

He was ever mild-mannered and soft-spoken and never visibly angry. He was courteous to his superiors, silent if he was ignored or overlooked, and unfailingly kind to his subordinates and to the many fisherfolk who came to him with their problems. He was always very fair in his judgements and decisions. He smiled often but rarely laughed out aloud. Since he was equally good to everyone, it was difficult to gauge his inner feelings.

Vernon was known as much for his dedication as for his honesty. He rarely took leave. Working late in the office was a habit – whether he had to scrutinise reports, hold discussions or attend meetings. He never wasted time in gossip or idle chatter.

No wonder he was very popular with the entire staff of the Fisheries Department. He would break no rules, nor encourage anyone else to do so, and would not defend anyone who did.

In 1979, he joined the BOBP as Senior Development Adviser in Chennai. Five years later, he moved to Bangkok as FAO's Regional Fisheries Officer, and retired from the FAO in 1991. He and his wife Chandra spent their retirement in Sri Lanka, also visiting their two daughters in the US and a son who now lives in Thailand. Vernon also helped out Sri Lanka's Ministry of Fisheries whenever necessary as a consultant. He served on the Board of Governors of NARA for a few years in the late 1990s.

I remember with pleasure the social chats and meetings with Vernon after we had both retired. We had a lot to talk about — fisheries, the fishing industry in Sri Lanka, FAO, family and friends. His death in August 2004 was a shock. I have lost a much-valued friend.

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation(BOBP-IGO).The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal fisheries – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

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After the Tsunami

Hoping for a Better Future

Fisheries and fisherfolk communities of India, Sri Lanka and the Maldives devastated by the December 2004 tsunami provide policy-makers with a massive challenge of rehabilitation – also with the opportunity to help create a brave and bright new world of fisheries. Has this opportunity been seized?

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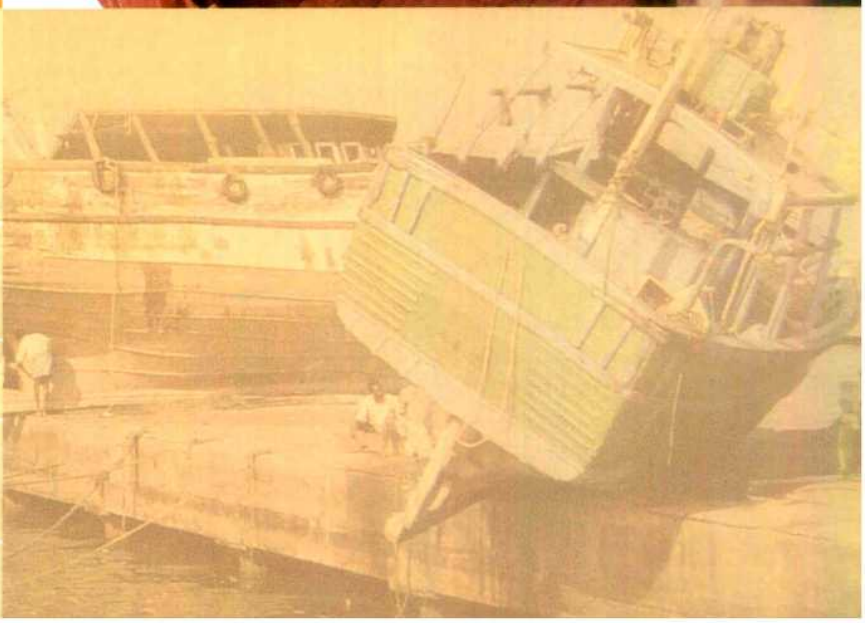
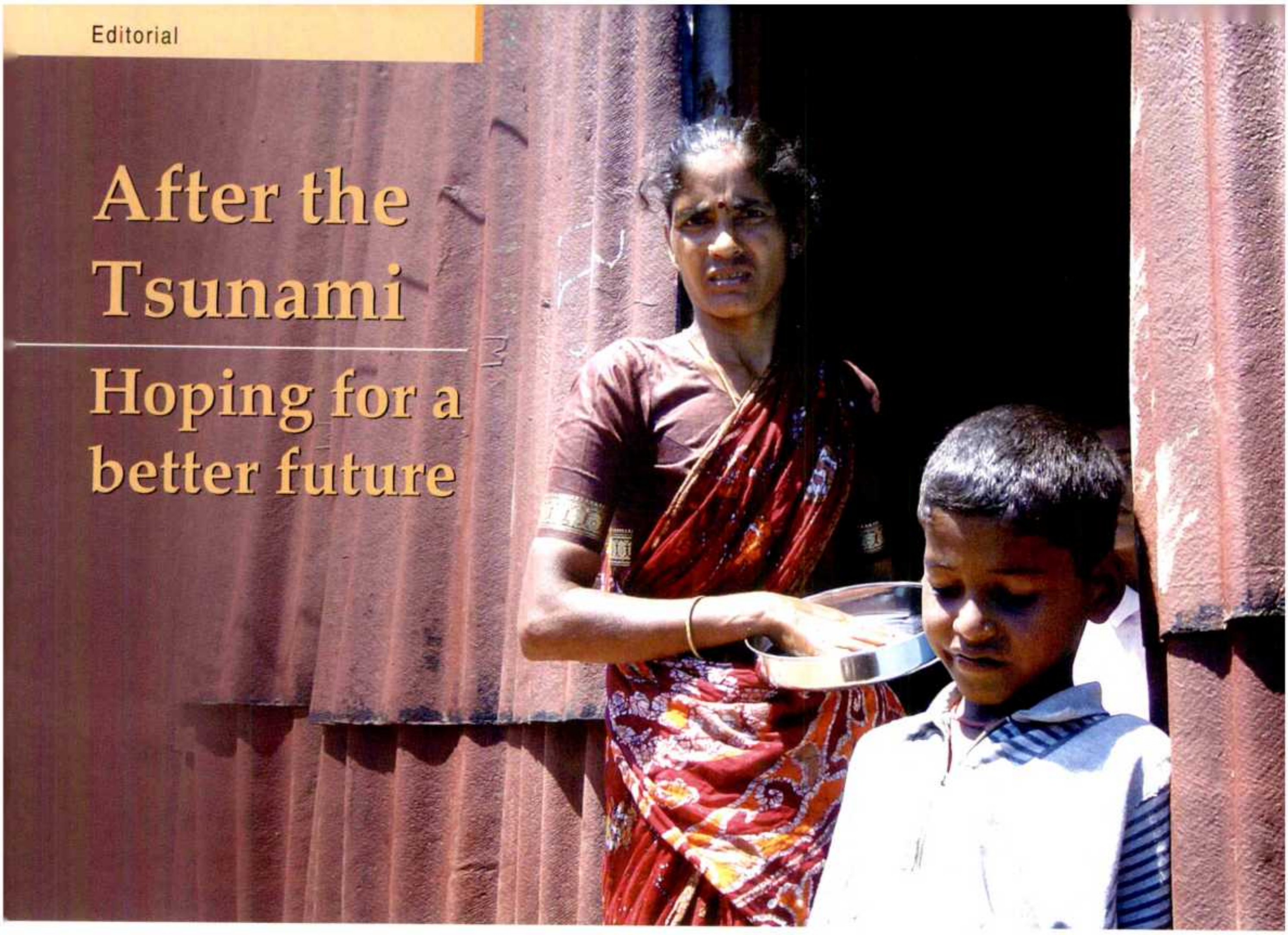


After the Tsunami

Hoping for a better future



The 26 December 2004 tsunami was an unprecedented global phenomenon that lasted for a few minutes but left a trail of destruction that would take years to restore the shattered lives and battered environment.

Fisherfolk communities in India, Sri Lanka, Maldives and Indonesia bore the brunt of the tsunami disaster. Beaches became graveyards. Boats and cars, even a train in Sri Lanka, were lifted and tossed aside like matchsticks. Thousands lost their livelihoods. The Mother Sea, their lifelong provider, had turned destroyer. Fishers who survived were physically, financially and emotionally battered, and disoriented.

The face of the coastline of Southeast Asia was transformed forever. Indonesia and Sri Lanka suffered greater loss of life, but the area enveloped by the tsunami was the highest in India, because of its long coastline and the chain of Andaman and Nicobar Islands. There was a definite impact on flora and fauna; its magnitude will take time to determine.

Although the natural disasters have tormented the coastal communities from time to time, these have never been adequately factored into the planning process. The result: loss of thousands of lives and millions of dollars worth property. The larger approach has been that these events are transient in nature and, therefore, can be addressed as and when they occur. There is an urgent need for an emphatic shift in the strategy for disaster management. Such a strategy should include prevention, mitigation, preparedness and relief as essential elements to cope with such events.

Immediate succour for fisherfolk communities was by and large efficient in India. There may have been exceptions: relief took longer to reach remote areas like the Andamans. And the relief was at times skewed – a few areas were inundated with aid, others got far less. But given the scale of devastation and the suddenness of it all, relief effort was creditable. Sri Lanka was perhaps initially overcome by shock; but the immense aid that flowed in from everywhere gradually trickled down.

The relief work is over in most of the countries affected by the killer waves. The rehabilitation phase has begun throwing more challenges for both the government and the affected communities. It's the long-term issues that matter now – the quality of life of fisher communities, restoration of their homes, their livelihoods, their future and capacity to cope with such events, and the state of resources. Has the opportunity for building a brave new world been seized?

Here are some snapshots from many subject areas of tsunami rehabilitation. If the overall picture is blurred, it reflects the fact that both in development and disaster management, problems are many but solutions few. And not all questions admit of easy answers.

- Considered synonymous with livelihoods, substantial amount of funds went in for boat building. The result - fisherfolk community has been showered with boats. They have come from all directions: Governments, NGOs and donors big and small. A serious over-capacity has resulted. For non-local NGOs, boats were the easiest way to spend money raised. Local NGOs accepted them to build up their standing among fisherfolk communities. Fishers accepted the boats even when they were not needed: this was an asset that could be sold. For all donors, the boat hulls were convenient to advertise their philanthropy. "Boats donated by" signs were bold and big. NGOs have often built FRP boats where kattumarams would have been appropriate, because "you can't paint your names on kattumarams" (to quote Vivekanandan of the South Indian Federation of Fishermen Societies (SIFFS) from ***Outlook*** magazine).

Boat building has been indiscriminate. One FRP boat yard on Chennai's East Coast Road normally built 30 boats a year. But it has already built more than 360 boats after the tsunami. Some of the new boats built by boatyards have turned out to be defective. They have needed repairs early, some have even capsized. Cases of mismatch between boats and engines are many: a classic example of "too many boats for too many fishermen."

A standard vallam has a 6 hp or 8 hp engine. But 10 hp engines are being fitted on post-tsunami vallams, often at the request of fishers. Result: vibrations on boats and breakdowns. Noble motives don't always lead to the right field actions.

The BOBP-IGO and the Tsunami

The BOBP-IGO took up a few activities to help the cause of fisherfolk rehabilitation following the tsunami. Examples: Fish marketing implements for fisherwomen of Orur and Olcott kuppam near Besant Nagar (pages 11-12). The regional initiative CONSRN, in which BOBP-IGO is a participant (pages 8-10). A Consultation that gave fishers of Tamil Nadu a forum to voice their needs and their views (pages 5-7). Perhaps the most interesting initiative was the art contests for schoolchildren in Tamil Nadu and Maldives (pages 17-20) which gave evocative expression to the kids' creative energy. A similar contest is to be held in Sri Lanka. Damage and needs assessment studies were conducted in Chennai, Cuddalore, Nagapattinam and Kanniyakumari districts in India. Data collected is being analysed.

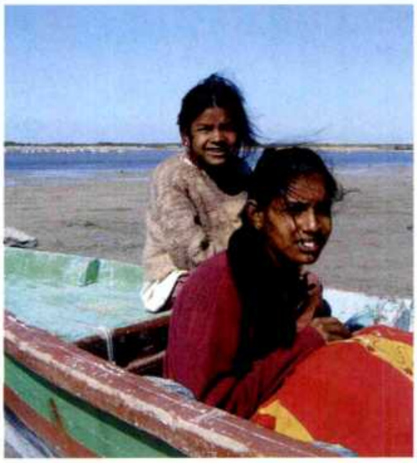
An analysis of four hamlets in Nagapattinam (by Mr K Thadeus) showed that while boats were being distributed indiscriminately, hardly any supplementary equipment such as nets and engines were being provided. Such is the over supply of boats that many trawler owners don't have enough crew – the former crew have their own motorized boats and are looking for crew themselves!

- The tsunami may have reduced the mechanized fleet, but the motorized sector has shown a phenomenal rise – a factor for strife on sea and land. The many FRP boats in some areas generate competition for the same fish variety, and a consequent drop in prices.
- One positive development was that some trawler owners accepted money to repair them but went in for vallams instead. Their trawlers were proving uneconomical, and the owners used this opportunity for a painless exit. Likewise, there was a reduction in shrimp-based mechanised operations, and an increase in intermediate craft using a wide range of nets, catching different fish and catering to domestic urban markets —this may help make fishing operations viable.
- Repair and renovation of damaged fisheries infrastructure is critical. But it is mainly fishing harbours that have received attention and help so far. Much

Fishermen weaving nets to resume fishing in Nagapattinam, Tamil Nadu.

needs to be done at the many beaches and fish landing centres used by traditional craft. This may tell on the quality of fish being landed.

- The tsunami instilled in fisherfolk communities a sudden and unaccustomed fear of the sea and its mysteries. They wanted their homes to be relatively far from the shore. But time eased this fear, and the communities now prefer the convenience of living close to the shore, despite the hazards. In fact some of them operate in two homes – the new one given by the government or some other source and the damaged one.
- The tsunami also saw one of the largest humanitarian operations ever. It triggered a global outpouring of money – billions of dollars in cash and kind. In India, some 650 NGOs in 13 coastal districts of Tamil Nadu and Pondicherry are flush with funds. There's squandering, misuse and abuse and little regulation. A Tamil Nadu Government order encouraged a "public-private partnership"; NGOs and corporates were expected to shoulder the bulk of the rehabilitation burden. This concept is excellent in theory, even laudable. But there has been little regulation of NGO activity. Some of the temporary shelters built for fisherfolk by NGOs have been unsatisfactory. Fishers were scorched this year by summer heat, later battered by rains. Water has invaded the shelters. Some temporary shelters caught fire during Diwali, perhaps because of fireworks. The Nagapattinam economy is booming, with all the cash-rich NGOs and their big spending.



- What of the future? A tsunami rehabilitation project in Tamil Nadu assisted by the World Bank and the ADB holds out strong hope. It will enable restoration and improvement of infrastructure including fishing harbours and landing sites, bar mouth dredging, and communication systems. The project also envisages diversification of the coastal economy, with emphasis on mariculture activities including lobster and crab fattening, and seaweed culture.

Fisherman mending his net, Sri Lanka.

Photo: Agnar Erlingsson

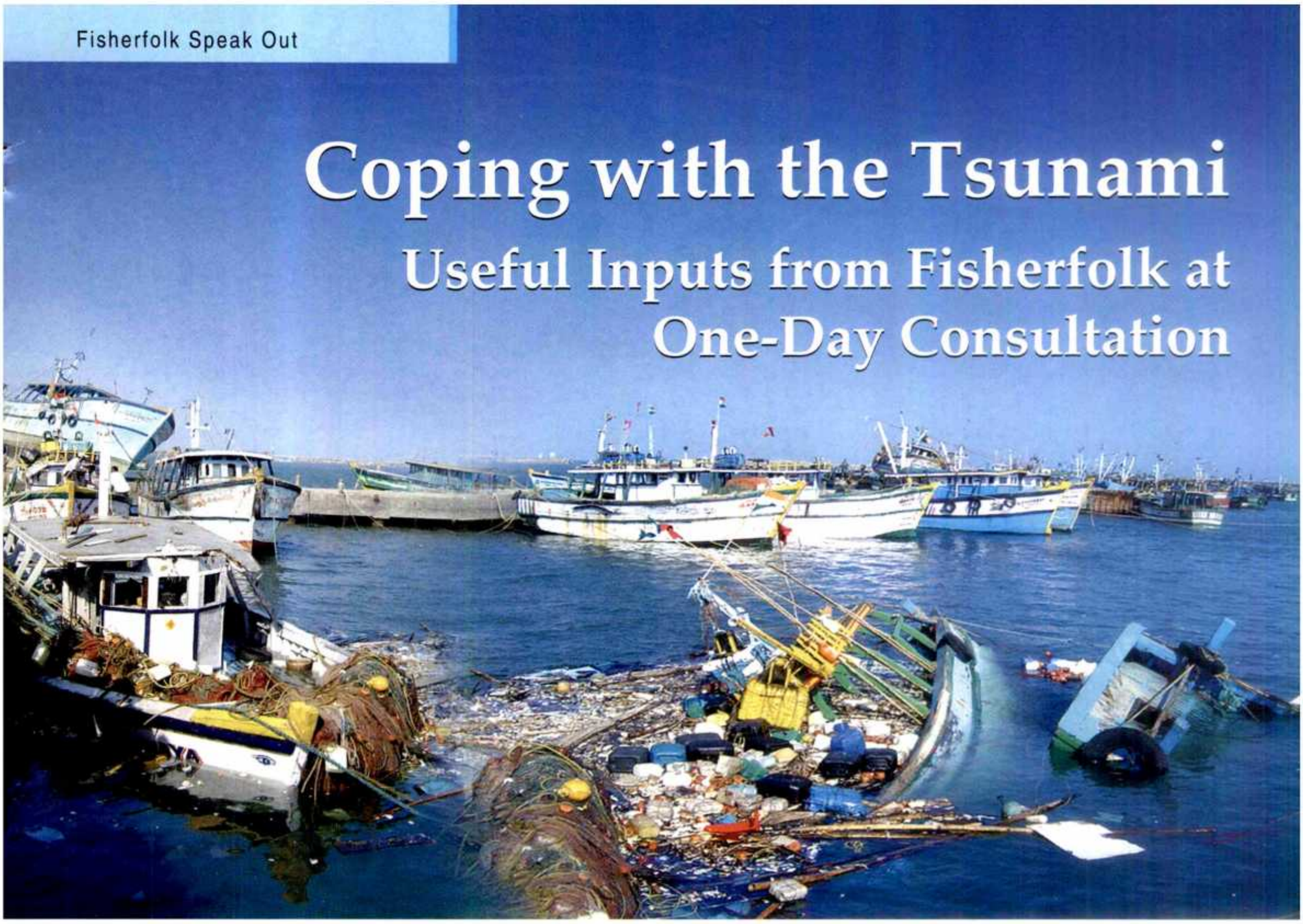
- Environmental studies are badly needed. Prof S Ramachandran of Anna University says the tsunami's churning of the ocean floor has affected sedimentation and the capacity of coastal wetlands to support marine life. He particularly mentions an impact on the demersal fishery.
- More inputs should be obtained from the scientific community in the task of rehabilitation, including permanent shelters for fisherfolk.
- Community preparedness to meet disasters like the tsunami has to be built up, through education, extension, research and training.
- Insurance schemes for fishing boats are essential. A motor vehicle can't go on the road without insurance; boats in the sea ought to face a similar imperative. Had such insurance schemes been in force, governments need not have spent millions of rupees on replacing fishermen's boats.
- Access to fisheries needs to be regulated, with caps on the number of boats in a particular area. Regulations are also needed on fishing gear, and these should be enforced.
- Fishers must be encouraged to take up other occupations. This is a gradual process, and requires training in other skills and vocations, and constant awareness-raising. Particular attention should be paid to the education of fisher children, so that they develop and pursue other interests – other than the joyous adventure of leaping into boats and setting out to sea.

The "brave new world" of fishers and fisher communities has yet to materialise, but there is no reason why it should not.

– Y S Yadava

Coping with the Tsunami

Useful Inputs from Fisherfolk at One-Day Consultation



What should be done to help fisher communities and restore fisheries in Tamil Nadu and Pondicherry after the killer tsunami of December 26, 2004? The subject was discussed in depth at a one-day Consultation held on June 11, 2005 in Chennai. It was organised jointly by the BOBP-IGO, the Tamil Nadu Department of Fisheries and the FAO country office in India.

Seventy-four persons took part: representatives of fisher communities as well as NGOs, leading fisheries officials of Tamil Nadu and Pondicherry, of the BOBP-IGO and the FAO.

Dr S S Tabrez Nasar, Senior Programme Advisor, BOBP-IGO, welcomed the participants on behalf of the organisers. Mr S K Prabakar, Director of Fisheries, made introductory remarks.

Ms G Ramalakshmi, Director of Fisheries, Pondicherry, detailed the tsunami's destruction as well as relief measures launched by the Union Territory Government. A Project Implementation Agency had been set up as an umbrella body to implement assistance given by the World Bank and to undertake related activities.

Dr Daniel Gustafson, FAO Representative for India and Bhutan, said the tsunami could mark a turning point for fisheries, and lead to new ways of managing the resources.

Mr V A Shegaonkar, Secretary, Department of Fisheries and Animal Husbandry, Tamil Nadu, said the State Government's steps to rehabilitate the fisher community included repair and replacement of fishing crafts and engines; release of ex-gratia payment to the injured and the dead; temporary and permanent shelters; opening of orphanages and deposit of funds in the name of orphan children; pension for all destitutes; mobilisation of medicare; dredging of silted fishing harbour basins; improvements in communication systems, etc. The Government has also negotiated with the World Bank and Asian Development Bank, etc for reconstruction assistance.

Dr Y S Yadava, Director, BOBP-IGO, said the Governments of Tamil Nadu and Pondicherry had done much by way of relief and rehabilitation following the tsunami's devastation, but lacked feedback from communities. This one-day Consultation brought different groups of stakeholders together to share experiences and learn from one another. The Consultation would help improve and advance the formidable tasks of rehabilitation.

Dr Yadava suggested that in the wake of the tsunami, a broad vision for fisheries development and management should be adopted. It would encompass exploitation of fish resources within sustainable limits; hygienic handling of fish at sea and on shore; a modern, efficiently managed onshore infrastructure to ensure high-quality fish standards; a programme of institutional and policy reform that addressed the vulnerability of fisher communities and made fishing practices sustainable; a strategy to improve the ability to assess institutional capacity at all levels, efficiently deliver development inputs and ensure that recipients utilised them well; and a livelihood approach that ensured that natural systems provided a broad and sustainable range of livelihood strategies.

The fisher community representatives articulated their views with conviction and confidence. They demonstrated an impressive grasp of their problems and a determination to better their lot in co-operation with governments and development agencies. Here is a list of what-should-be-done suggestions by the fisher community, classified by subject area.

***Government Schemes and Programmes*:** Explain and make fishermen better aware of existing government schemes for their welfare. Help fishers to undertake deep-sea fishing, give them the equipment and training for sustainable fishing (equipment would include echo sounders, fish finders, two-way radio sets). Implement the Central Government's subsidy schemes for fishing boats. Provide more money for trawler repair, more diesel on subsidised rates. Increase the subsidy on engine cost. Reduce the taxes on iron (needed for boat construction) and on wood (needed to construct wooden boats). Help them pay their high insurance premiums on boats. Provide life jackets for FRP boats. On the other hand, discontinue loans provided by the National Cooperative Development Corporation, help settle conflicts in fishing grounds resulting from the surfeit of FRP boats provided by NGOs to fishermen.

Infrastructure: Establish mini harbours or fish landing centres on fishing sites, which do not have proper landing and berthing facilities. Repair and renovate damaged harbours and landing centres. Set up link roads to connect harbours and markets, and improve basic facilities, such as clean water, at harbours. Fishermen should be given the opportunity to manage fishing harbours and landing centres. Reduce the congestion at Chinnamuttam fishing harbour (in Tamil Nadu), where some 300 boats now operate, against the designed capacity of 150 boats. Carry out dredging wherever necessary at harbour basins.

Rehabilitation Programmes for Tsunami Affected Fisher-Communities in Tamil Nadu and Pondicherry
Consultation with Stakeholders

Mr S K Prabakar delivering the introductory remarks (top) and participants at the Consultation (bottom).

Institutional Finance: Reduce the heavy burden of taxes on poor fishermen. Implement the Government's Action Plan, particularly the announcement of no sales tax for one year announced by the Chief Minister. Give women's self-help groups and women fish vendors loans to set up processing facilities and do retail marketing.

Post-harvest: Start some innovative schemes for hygienic marketing of fish. Help women fish vendors with transport assistance, so that they can carry the fish to markets (right now, buses are reluctant to let in women with their fish baskets). Improve and strengthen cold chain facilities to reduce post-harvest losses.

***Community Development*:** Ensure that tsunami relief is extended everywhere (it has yet to reach certain places). Provide land and build proper houses for fishermen who lost their dwellings due to the tsunami. (They live right now in temporary shelters that get too hot during the day.) Further, make sure that these houses are not squeezed against one another in congested settlements, but distributed wider. Ensure that new houses are constructed 200 m away from the shore and five feet above the ground level. Implement a literacy programme targeted exclusively at fishers. Provide free education to fisher -children in English-medium schools.

In Kanniyakumari, where literacy levels are high, start a college to take care of higher education needs. Increase the quota for the fisher community in Tamil Nadu's only fisheries college from five seats to ten. Set up special banks for fishermen on the lines of banks for farmers. Provide special finance and bear the responsibility for bringing up children orphaned by the tsunami. Allot fishers quotas for both education and jobs, treating them on par with Scheduled Castes and Tribes. Assist fishermen in accessing and obtaining alternative livelihoods. Make electricity available to them at subsidized rates.

Help the rehabilitation of tsunami-hit fishermen through special counseling efforts. Help the families of fishermen who went missing after the tsunami, and have to wait for seven years before any compensation can be paid to them. Organise pensions for Tamil Nadu fishermen on the lines of pensions that Kerala fishermen enjoy. (It was suggested that fishermen avail of the pension schemes of insurance agencies.)

General Issues: Study the phenomenon of sea erosion, which has worsened after the tsunami. Construct sea walls or groynes in all villages close to the sea. Encourage mangrove plantations to save coastal areas from erosion. Clear river mouths to facilitate movement of boats. Ensure that the Sethusamudram project does not damage fisheries in the area. Bring back boats washed away to the Sri Lankan shores. Stop the sand mining now being done in some low-lying areas of the coast.

At the concluding session of the Consultation, fisheries officials from Tamil Nadu and Pondicherry replied to the queries of fisher groups. Ms Mary Chinna Rani, Deputy Director, Government of Pondicherry, said that so far Rs. 38 crores had been spent to repair 1 200 boats. A Fishery Cooperative Society is being planned, a shore-to-vessel communication tower has been installed and scholarships have been provided for senior school students — @ Rs 200 for boys and Rs 300 for girls. As regards the future, community halls and information centres would be set up, communication equipment, fish finders and echo sounders would be provided at subsidised rates, a cold chain programme would be implemented. Two fish markets with modern facilities would also be set up in Pondicherry.

Mr Mohanasundaram, Joint Director (Fisheries), Nagapattinam, said that more information was required about the after-effects of tsunami on the ecology of the coastal waters and fisheries resources. He said that the statistical database (number of fishing boats, horsepower of engines used in mechanised boats, the effort put in by such boats) should be strengthened. Trawling operations should be gradually stopped. Fishing harbours should be modernised to reduce post-harvest losses in fisheries.

Mr Md. Lingaraja, Joint Director (Fisheries), Tuticorin, suggested that sea ranching should be undertaken to replenish stocks. He suggested activities like cultivation of ornamental fishes to give fishers alternative livelihood options.

Fishers at the meeting felt that the Consultation was very useful and would lead to more effective rehabilitation programmes. They suggested that the beginning made through this Consultation should continue and more such Consultations should be organised.

Participants at the Consultation.

BOBP
Rehabilitation Programmes for Tsunami Affected Fisher-Communities in Tamil Nadu and Pondicherry
Consultation with Stakeholders
Chennai, 11 June 2005

CONSRN: A Consortium for a Cause

The December 2004 tsunami not merely shocked and devastated coastal economies and populations of several countries, it also spurred several co-operation initiatives. One of these is CONSRN, the Consortium to Restore Shattered Livelihoods in Tsunami-Devastated Nations.

Partners of the Consortium are the FAO, through its regional office for Asia and the Pacific in Bangkok; the BOBP-IGO, based in Chennai; NACA, the Network of Aquaculture Centres in Asia-Pacific, based in Bangkok; SEAFDEC, the South East Asian Fisheries Development Centre, based in Bangkok; and the World Fish Centre (WFC), based in Penang, Malaysia. Interested NGOs include the Asian Disaster Preparedness Center (APDC), the Sustainable Development Foundation (SDF), and the International Collective in Support of Fish Workers (ICSF).

CONSRN was conceived on December 31, 2004, and initiated at a meeting on 11 January, 2005. It is a forum for sharing information, assessing needs, developing strategies, coordinating assistance, supporting governments in enabling rehabilitation.

Why a consortium? Won't it merely generate more talk and more reports when what people want is more action? What can a consortium without infrastructure, staff or funds do that governments and large established international and national entities cannot?

The rationale for agencies like CONSRN is that governments and local authorities are often more effective at immediate relief than long-term rehabilitation. Relief calls for instant assessments and instant action, something akin to fire-fighting. But what after the fire has been put out? Rebuilding and rehabilitation require strategising and planning based on a clear vision, long-term principles and sound policies. The opportunity for building a new order that's better than the old must be seized.

CONSRN has a role here, because of the experience and expertise of its member-partners. At a 3-day Workshop in Bangkok (28 February-1 March, 2005), the Consortium formulated a vision for fisheries and aquaculture. It should help alleviate poverty; it should ensure sustainable livelihoods and food security; it should be based on sound regulation and good governance, it should use appropriate technologies; it should enable holistic management; it should put in place a well-integrated supply chain from harvest to consumer.

Fishermen with their damaged boats in Nagapattinam, India.

The Workshop also set out guiding principles toward the vision: Put people first, with a livelihood-focused approach; rehabilitate the whole production and marketing chain; let rehabilitation effort be consistent with international agreements and guidelines.

Specific policy guidelines are to be drawn up for several aspects of post-tsunami fisheries and aquaculture development by various Consortium partners on the basis of their expertise. Examples:

1. **Boats vs livelihoods.** Coastal communities and small-scale fishers have been hit badly by the tsunami. Is providing boats the best way of easing the hardships of these fishers? The World Fish Center has already

drawn up a set of guidelines on addressing livelihoods concerns.

2. **Optimal fishing capacity:** We must ensure a fishing capacity commensurate with the resource; and a balance between artisanal and industrial fisheries. We must understand the dynamics of both the resource and those who tap it. Guidelines will be formulated by the FAO.
3. **Safety at sea:** Much needs to be done in this critical area. For marine fisherfolk, the sea (***kadalamma*** or the Sea Mother in Tamil language) is their provider and saviour, but they must not take it for granted, they must follow the right norms and practices, use the right equipment. The BOBP-IGO will draw up guidelines.
4. **Non-destructive fishing gear:** Gear provided to fisherfolk during relief and rehabilitation ought to be non-destructive, else it will accentuate the problems of everyone who taps the marine resource.
5. **Co-management of resources:** All stakeholders must be involved in policy formulation and decision-making. Management should be based on full participation, the right representation, and the best scientific information available.
6. **Aquaculture and the environment:** Guidelines are needed on how aquaculture can pursue environmentally sound management practices that do not pollute, do not damage habitats or cause irreversible harm.
7. **Sustainable aquaculture technologies:** The aquaculture industry should adopt technologies and farm management practices appropriate for rural populations

From top to bottom: Repair and restoration of fishing boats in Maldives, India and Sri Lanka.
(Top and bottom Photos by Agnar Erlingsson)

with limited resources. It should support farmer organisations, follow fair trade practices, develop regional and international partnerships, facilitate dialogue and experience-sharing. NACA will develop guidelines on aquaculture development.

8. **Markets and trade for aquaculture practices:** Fish handling practices at sea and infrastructure on shore must ensure high food quality and safety. Practices in post-harvest processing and marketing must ensure food safety, add value and minimise wastage and loss. Policies must be informed by sound understanding of markets and production chains and ensure access to small-scale producers.

9. **Disaster preparedness:** We must reduce the risks coastal communities face from natural disasters. Efficient design and location of infrastructure and protection of the coastal zone environment are two of the issues.

10. **Reduction in livelihood vulnerability of coastal communities:** Guidelines are needed to identify coastal communities (or sections among them) who are most vulnerable, understand their livelihoods, address their key risks and devise coping strategies through social safety nets or empowering mechanisms.

11. **Putting people first:** A favourite buzzword! But how do we ensure that we put people first? Stakeholder consultations to ascertain their problems and viewpoints, respect for their access rights, ensuring adequate labour standards, ensuring access to land, equitable distribution of benefits, assistance that is dictated by need rather than by legal status – these are some of the principles and practices to follow.

12. **Coastal zone management:** Rehabilitation measures should conform strictly to coastal zone management norms. Decisions should be based on scientific merit and people's need. What is in their best interest, and the best national interest, should be the overriding criteria for development.

13. **Alternative livelihoods for fishers:** This has been proposed by many tsunami rehabilitation agencies. But what and where are the alternatives? Experts at national and local levels should study and identify livelihood options for coastal communities, including those that do not depend on natural resources. The support needed from national governments and local institutions should be spelled out.

Six key strategic elements will form the basis for CONSRN activities.

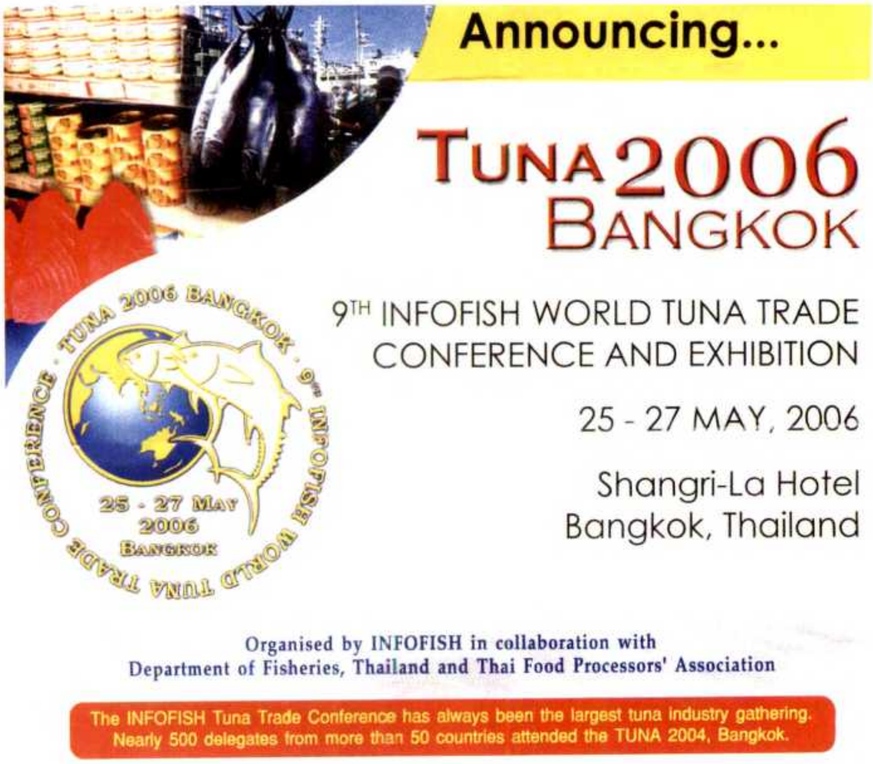
- Improve policies, institutions and processes,
- Provide physical assets,
- Restore the natural environment,
- Provide appropriate financial mechanisms,
- Build human capacity to improve community livelihoods and responsible coastal resource management, and
- Rebuild and enhance the social assets resources and networks in affected fishing and aquaculture communities.

Details are provided in two publications – FAO/RAP publications 2005/05 and 2005/09.

CONSRN's assistance for tsunami rehabilitation has thus been in the realm of ideas, plans and strategies so far. The Consortium needs money to provide more direct and substantive help. Donors, please note!

A BOBP-IGO video film captures the destruction caused by the Tsunami and the on-going reconstruction processes

A 20-minute video film shot by the BOBP-IGO captures the unprecedented destruction to life and property caused by the 26 December 2004 tsunami and the reconstruction processes initiated by the government and non-governmental agencies. The film will be released during December 2005.


TUNA 2006 BANGKOK · 9th INFOFISH WORLD TUNA TRADE CONFERENCE
25 - 27 MAY 2006 BANGKOK

Announcing...

TUNA 2006 BANGKOK

9TH INFOFISH WORLD TUNA TRADE CONFERENCE AND EXHIBITION

25 - 27 MAY, 2006

Shangri-La Hotel
Bangkok, Thailand

Organised by INFOFISH in collaboration with
Department of Fisheries, Thailand and Thai Food Processors' Association

The INFOFISH Tuna Trade Conference has always been the largest tuna industry gathering. Nearly 500 delegates from more than 50 countries attended the TUNA 2004, Bangkok.

Fisherwomen get marketing assistance from BOBP-IGO

Some 40 women fish vendors of two fishing villages near Besant Nagar in south Chennai reeling from the tsunami have received some vital assistance from the BOBP — fish marketing equipment to enable them to resume their livelihood and feed their families. The equipment consists of an ice box, a weighing balance, an aluminium container, and an aluminium bucket.

"Battered by the tsunamis, they are up for the challenge" reported the Indian Express in its 8 February 2005 edition. For women fish vendor of the Besant Nagar fish market who had lost all their equipment during the tsunamis, the new materials provided by the Bay of Bengal Programme were nothing less than a fresh lease of life".

Six hundred families live in the two villages — Orur Kuppam and Orur Olcott Kuppam. Nearly a third of the houses and almost all of the craft and the gear in the villages were destroyed by the tsunami. With fishing craft from the beach nearby unable to go out to sea, the fisherwomen could earn some money only by buying fish from distant markets at Royapuram or Saidapet. The BOBP package, decided on after a team from the Programme visited the villages, facilitated such fish purchase.

Said Anjalai, president of the co-operative society of women fish vendors, the Orur-Olcott Kuppam Meenavar Mahalir Sangam, "We lost our all because of the tsunami. Fishing has stopped at our villages. We have to travel far to buy and market fish. We did'nt have the most

basic implements to buy fish. This equipment was a boon, and very timely."

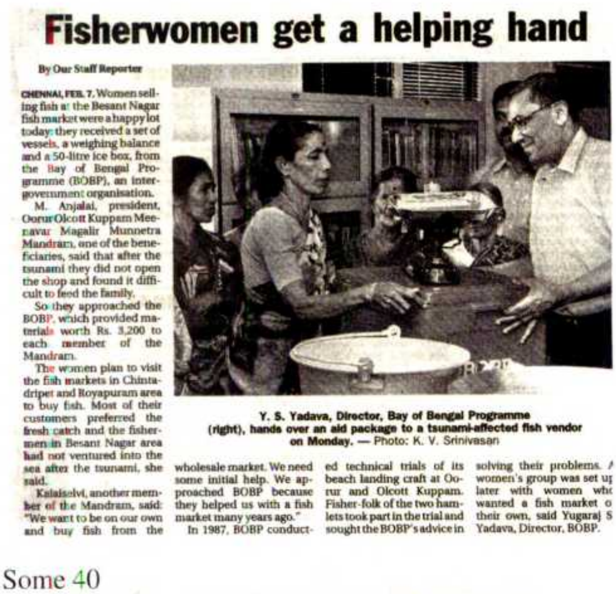
Jeeva, another fish vendor, said, "It's natural that we approached BOBP for assistance. We have known this project for a long time. We got a fish market from the Corporation at Besant Nagar with their help."

The BOBP has been active in the two villages since the mid-1980s. It carried out fishing boat and gear trials with the fishermen; it coordinated with the Corporation of Madras and the Department of Fisheries on the proposal for a fish market at Besant Nagar near the fishing villages, after the women said that such a market was their dream, what they most wanted.

The market came into being in August 1990, some two years after BOBP engaged a social worker to help the women think through their problems. It encouraged them to meet the Commissioner of the Chennai Corporation to request a fish market, provided a design for the market through a consultant, trained the women in financial management and in the basics of setting up, running and maintaining a co-operative society, and mobilized co-operation from several stakeholders.

The market had a difficult birth but was well received by the public – it was a regular and reliable source of fish in a hygienic environment. Some 40 fisherwomen, members of the society, sold fish at the market when it was launched, but the market gradually ran into problems, caused partly by divisions among fisherwomen. That the market still continues is a tribute to the doughty spirit of the women. BOBP-IGO plans to revitalise the market with the support of the Government of Tamil Nadu

Some 15 women sell fish in the market now. But nearly all the original 40 members have received fish marketing equipment from the BOBP-IGO. "It gave us hope and help at a difficult time," says Krishnaveni, one of the members of the society.



Fisherwomen get a helping hand

By Our Staff Reporter

CHENNAI, FEB. 7. Women selling fish at the Besant Nagar fish market were a happy lot today: they received a set of vessels, a weighing balance and a 50-litre ice box, from the Bay of Bengal Programme (BOBP), an inter-government organisation.

M. Anjalai, president, Oorur Olcott Kuppam Meenavar Magalir Munnetra Mandram, one of the beneficiaries, said that after the tsunami they did not open the shop and found it difficult to feed the family.

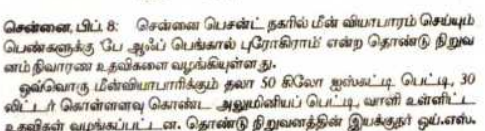
So they approached the BOBP, which provided materials worth Rs. 3,200 to each member of the Mandram.

The women plan to visit the fish markets in Chintadripet and Royapuram area to buy fish. Most of their customers preferred the fresh catch and the fishermen in Besant Nagar area had not ventured into the sea after the tsunami, she said.

Kalaiselvi, another member of the Mandram, said: "We want to be on our own and buy fish from the wholesale market. We need some initial help. We approached BOBP because they helped us with a fish market many years ago."

In 1987, BOBP conducted technical trials of its beach landing craft at Oorur and Olcott Kuppam. Fisher-folk of the two hamlets took part in the trial and sought the BOBP's advice in solving their problems. A women's group was set up later with women who wanted a fish market of their own, said Yugaraj S Yadava, Director, BOBP.

Y. S. Yadava, Director, Bay of Bengal Programme (right), hands over an aid package to a tsunami-affected fish vendor on Monday. — Photo: K. V. Srinivasan



மீன் வியாபாரம் செய்யும் பெண்களுக்கு நிவாரண உதவி

சென்னை, பிப். 8: சென்னை பெசன்ட் நகரில் மீன் வியாபாரம் செய்யும் பெண்களுக்கு 'பே ஆஃப் பெங்கால் புரோகிராம்' என்ற தொண்டு நிறுவனம் நிவாரண உதவிகளை வழங்கியுள்ளது.

ஒவ்வொரு மீன்வியாபாரிக்கும் தலா 50 கிலோ ஐஸ்கட்டி பெட்டி, 30 லிட்டர் கொள்ளளவு கொண்ட அலுமினியப் பெட்டி, வாளி உள்ளிட்ட உதவிகள் வழங்கப்பட்டன. தொண்டு நிறுவனத்தின் இயக்குநர் ஒய்.எஸ். யாதவா இவற்றை வழங்கினார்.

Ex-BOBP Staffer Helps Women Fish Vendors

The women fish vendors of Orur and Olcott Kuppam received some financial help this year from a former staffer of the BOBP- Mr Arne Andreasson, who was Development Adviser with the Programme in Chennai, and is now the Coordinator of the World Bank-funded Fourth Fisheries Project, Bangladesh.

Shocked by the tsunami and its impact on fisheries, Mr Andreasson paid a private two-day visit to Tamil Nadu in March 2005. He visited fishing communities and landing centers in Cuddalore, near the Marina in Chennai and at Royapuram. He also visited the fish market at Besant Nagar and met the women fish vendors there.

Mr Andreasson made a donation of US $ 1,000 to the Orur-Olcott Meenava Mahalir Munnetra Sangam through the Rotary Club of Madras South. The money was handed over on behalf of the club to Anjalai and Krishna Veni, members of the sangam, at its meeting on March 22. The money, like the fish marketing equipment by BOBP-IGO, enabled purchase of fish by the women vendors from whole markets at Chintadripet and Royapuram.

Mr Andreasson wrote an article in a Swedish newspaper on the impact of the tsunami on fisherfolk communities in Tamil Nadu. The article provoked discussion among readers, particularly members of the Swedish Fisheries Union.

BOBP-IGO Technical Advisory Committee Meets in Maldives

The BOBP-IGO held the first meeting of its Technical Advisory Committee (TAC) at the Marine Research Center, Malé, Maldives, on September 4 and 5, 2005. Representatives of the four member countries (Bangladesh, India, Maldives and Sri Lanka) took part. Dr Shiham Adam, Executive Director of the Marine Research Centre (MRC), Government of Maldives chaired the meeting.

The Technical Advisory Committee is the body that discusses and makes recommendations for the BOBP-IGO's work. Those that are approved by the BOBP-IGO's Governing Council become a part of the organisation's work plan.

In his welcome address, Dr Adam complimented the BOBP-IGO on the remarkable quality of its publications, some of which had been prepared in collaboration with the MRC. He said that all the four major programme areas of the BOBP-IGO were very relevant to the Maldives. He cited in particular Maldives's concern about the sustainability of export-oriented reef fishery resources. He hoped that BOBP-IGO would work closely with MRC, which faced limitations in human resources and in institutional mechanisms.

In his inaugural address, the Chief Guest, Mr Abdullah Kamaaludheen, Minister of Agriculture, Fisheries and Marine Resources, remarked that BOBP-IGO had a significant role to play in the area of marine fisheries management.

Summarising the BOBP-IGO's work in 2004-2005, Dr Y S Yadava referred to the IGO's co-operation with CONSRN (see pages 8-10), the one-day Consultation on tsunami rehabilitation with fisher communities of Tamil Nadu and Pondicherry (pages 5-7), a translation of seven Technical Guidelines prepared by the FAO Rome on the Code of Conduct for Responsible Fisheries, a comprehensive post-tsunami survey of Tamil Nadu and Pondicherry, the on-the-spot art contests for school children from tsunami-affected countries, and the preparations for IFISH 3 (page 36). The BOBP's emphasis on Information Services continued – an example was the website developed for IFISH 3 (www.ifish3.org), updating of the BOBP-IGO website, and digitization of the huge photo resource. The TAC appreciated the children's art contests, which represented a unique approach to awareness-building.

Member countries described their proposals and priorities. Dr Md. Khalilur Rahman, representative of Bangladesh, said that constraints impeding the sustainable development of marine fisheries in Bangladesh are pollution, illegal fishing both by nationals and by the foreign fishing fleet, under-exploitation of commercially important species, lack of infrastructure and facilities, lack of trained manpower, and lack of knowledge on stock assessment of commercially important species.

Some of the urgent national priorities for Bangladesh: stock assessment of commercially important species, maintaining the ecological balance, conserving biodiversity, prevention of habitat destruction, mariculture of commercially important species, control and prevention of shrimp diseases, improving research capabilities, developing trained manpower needed to addressed urgently.

The Bangladesh delegate proposed that a networking system should be established among member-countries. Development of a directory of scientists of member countries working on fisheries could be a first step towards coordination and co-operation among scientists of member countries.

The TAC urged the Secretariat to develop a directory of scientists and organisations in member countries. Such a directory could begin with the four member countries. It would help strengthen networking activities.

Participants at the Technical Advisory Committee Meeting.

The TAC felt that the BOBP-IGO should focus on issues under the mandate of the IGO and avoid duplicating the work of other IGOs such as NACA.

Following a presentation by India's representative, Mr K N V Nair, the TAC noted that fisheries management is one of India's priorities. This included a review of the ban on fishing during monsoon months, regulation of fishing effort and access, a ban on destructive fishing gear, identification of fish stocks that need rejuvenation, stock assessment of selected demersal resources. Overexploitation of coastal fisheries and its open-access nature; inadequate mechanisms for monitoring, control and surveillance (MCS); operation of destructive fishing gear; weak linkages between research and development institutions –these were also major issues. As regards welfare measures, rehabilitation of fisherfolk during calamities, alternative vocations when a fishing ban was imposed, and training of fisherwomen in handling crisis like the tsunami were some priority areas.

Dr Adam from the Maldives said that tuna and coastal fisheries (particularly the bait fishery) were the most important in the Maldives. The bait fishery generates a catch of 15 000 -20 000 tonnes per year but is difficult to monitor; the actual catch is possibly higher.

The TAC noted that suggestions from the Maldives included taking the Code of Conduct for Responsible Fisheries to the grassroots level, assistance in implementing the management plan for grouper species, and activities to initiate co-management practices in fisheries.

Mr H S G Fernando, the delegate from Sri Lanka, said that exploitation of offshore and deep-sea fisheries in the Island had crossed sustainable limits. Most coastal resources too have been over-exploited; the stocks of some species are on the decline. Of the other major fishery resources in Sri Lanka, lobsters have been highly exploited, leading to decline in production.

Sri Lanka's national fisheries priorities relate to access to rights and resources, fishing technology improvements, fisheries management, stock assessment and enhancements. The TAC noted the need to improve labour relations and conditions of employment, capacity development in areas such as MCS, and training for fisherwomen. Tsunami rehabilitation was of course a prime concern.

After listening to presentations by country representatives, the Secretariat of BOBP-IGO presented an overview of some of the thrust areas for consideration by the TAC. These included:

- Capacity building for long-term interventions and strategies for safety at sea of artisanal and small-scale fishermen;
- Capacity building for implementation of MCS programmes;
- Joint assessment of fish stocks through collaborative and participatory arrangements among member countries. (Major fisheries institutions of member countries could be tapped for this programme.)
- Developing management plans for important fisheries of member countries.

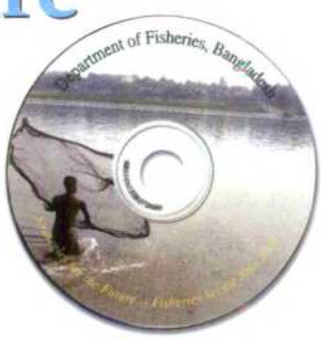
The Secretariat informed the Committee about its approach to Information and Networking: a) Assess and strengthen as necessary the present technical networking capacity in BOBP-IGO member countries; b) Build and expand the capacity of member countries to integrate the use of electronic media into their day-to-day operations; c) Develop networks between and among BOBP-IGO stakeholders at the regional level for sharing knowledge, experiences, and best practices; d) Help coordinate and mobilise appropriate resources from the international community, as well as those available nationally and regionally and e)Support capacity- building required for this.

The TAC also noted the broad components of the programme, which includes maintenance of the website (www.bobpigo.org) and initiation of discussion platforms on subjects of topical concern in the region. The Secretariat will continue to produce easy-to-use manuals, leaflets, brochures, pamphlets, flipcharts, calendars, periodicals, newsletters, videos, posters and books.

- The TAC appreciated the Secretariat's initiative to organise IFISH 3 and the deployment of a FAO/ BOBP-IGO Consultant to member countries to prepare a report on the status of safety measures in the fishing boats and implementation of standards and regulations to safeguard the safety and health of small-scale fishermen.
- The TAC advised the Secretariat to organise the first Regional workshop on Monitoring, Control and Surveillance during the middle of 2006, preferably in conjunction with some other activity to optimise on the costs.
- The TAC agreed to the suggestion of the Secretariat that the translation of CCRF guidelines into the local languages of all member countries should be given priority. The Committee also urged a review on the status of fisherwomen in member countries. The findings of such a review could lead to specific gender-related activities.
- The TAC welcomed the Secretariat's proposal that member countries second suitable professionals to work with the BOBP-IGO Secretariat for a specified time-period.
- The Committee agreed to convene the second meeting of the TAC during mid- 2006 in Dhaka, Bangladesh, subject to the concurrence of the Government of Bangladesh. A regional workshop on MCS would also be held along with this meeting.

Bangladesh Spells Out Strategies for the Future in Fisheries and Aquaculture

The Department of Fisheries, Bangladesh, with assistance from the Fourth Fisheries Project and the co-operation of many stakeholders, has spelled out strategies for the future in various areas of fisheries and aquaculture. **Bay of Bengal News** *takes a look at these strategies.*



Bangladesh had formulated a National Fisheries Policy in 1998. It spelled out the country's objectives in fisheries: to increase fish production, alleviate poverty, improve the conditions of fishers, provide animal protein, strengthen foreign currency earnings through export, and promote ecology, biodiversity and public health.

How are these objectives to be achieved? A pathway to the objectives has now been clearly laid out by the Department of Fisheries, particularly by its Fourth Fisheries Project. The "pathway" is in the form of a National Fisheries Strategy and several sub-strategies. The strategies outline management approaches to implementing the National Fisheries Policy, taking into account likely changes in the fisheries scenario over the next 10 years.

The National Fisheries Strategy evolved through a series of studies, papers, discussions and meetings represent one of the largest, widest and most significant consultative exercises of its kind ever undertaken in Bangladesh fisheries. The National Fisheries Strategy includes strategies and action plans for eight sub-sectors.

Common to the National Fisheries Strategy and the sub-strategies is a core of central principles and themes – such as decentralization, people's participation, poverty alleviation, gender equity. The National Fisheries Strategy was also guided by the Government's Poverty Reduction Strategy Paper, and by a number of international agreements signed by the government.

Here are summaries of the sub-sector strategies.

Inland Capture Fisheries Strategy

Aim : Sustainable management of inland capture fisheries for fishing communities and users.

Inland fisheries has over the years been replaced as top fish producer by aquaculture, due mainly to decline and degradation of inland resources. The first priority now is improved biological management that will arrest decline in production.

A few key components of the strategy are: Leasing policy for the resource should be based primarily on resource-user access rather than on revenue generation. Access restrictions are needed to ensure management control over the resource and prevent over-fishing. Community planning and management interventions such as sanctuaries, control of fishing effort, habitat restoration or stocking should be encouraged to ensure sustainability.

Community participation is essential for the success of the strategies.

Aquaculture Strategy

Aim: To support the continued development of aquaculture as a key supplier of animal protein by (a) providing a regulatory structure to ensure quality inputs, and (b) by providing services to enhance knowledge to promote production.

The aquaculture sector expanded rapidly from the 1970s; many problems have arisen, perhaps because of uncontrolled expansion. The main problems relate to the quality of inputs, especially fingerlings. What's needed is a regulatory framework to ensure supply of quality inputs; a registration scheme for all hatcheries that produce fingerlings; a certification scheme for hatchery-produced fingerlings; and regulations for other input suppliers, such as feed producers.

Aquaculture Extension Strategy

Aim: An efficient, effective need-based extension service provided to all categories of farmers, to help them increase aquaculture production to an optimum sustainable level.

The Aquaculture Extension Strategy was first drafted in 2002, an Action Plan for its implementation was drawn up a year later. In fact, this was the first strategy to be ready. The key principles recognised for the strategy (collaboration, participation, decentralization, etc.) became key principles also for the other strategies. The Aquaculture Extension Strategy focuses on pond aquaculture, but also covers other forms of culture fisheries.

The new extension service strategy will foster collaboration with other extension providers to ensure maximum coverage by the target audience. It is designed to move extension away from dependence on short-term development projects.

Planning, Monitoring and Evaluation Strategy

Aim: To develop systems in the Department of Fisheries capable of monitoring progress towards the objectives of the National Fisheries Policy, and evaluating activities directed at these objectives.

The objectives of the National Fisheries Policy are many and diverse. A system to monitor progress towards these objectives would be complex, and would require many different types of expertise. The Department of Fisheries should play a leading role in establishing and managing the system. It should develop its own capacity for monitoring and evaluation in several areas of fisheries production and development. The Department should also be able to develop and enforce protocols for fisheries data collection sponsored by external organisations. It should establish networks with other departments and agencies.

To develop its own capacity, the Department may have to set up an integrated Planning, Monitoring and Evaluation wing that will translate findings into improved design of new projects and programmes.

Marine Strategy

Aim: Ensure the sustainable management of marine fisheries by allocating fishing rights to communities and fishing groups, and by providing the regulatory framework for this management.

Industrial fishing boats, mechanisation of traditional boats, more and more people in artisanal and shore-based fishery – all this has dramatically increased in marine fishing effort. Development has been largely uncontrolled, with neither management nor sound knowledge emerging on how the industry is coping. Ownership of the resource has moved out of the hands of fishermen into the hands of wealthy businessmen and traders.

Some of the actions needed: Ensure resource access on a priority basis to poor shore-based fishermen, then to offshore fishermen, then to commercial fishermen. Establish a register of fishermen. Identify and allocate resources to be fished by the poor, formulate management plans, get local institutions to support resource management. Grant access rights to registered fishers to control fishing effort.

Shrimp Strategy

Aim: A shrimp sector recognised internationally for high-quality shrimp. It should be produced using socially responsible and environmentally sustainable production methods.

The shrimp sector has tremendous potential for the national economy and for private sector stakeholders. It needs a regulatory framework, with participation and recognition by all stakeholders. It will bring about standards and regulations fostering sound management of shrimp production. It will deal with all areas of shrimp sector development – production, quality control, marketing and export, environment and social aspects. The regulatory framework will ensure sustainable increases in the supply and value of shrimp, enhance farmer earnings, improve the socio-economic conditions of local communities and increase foreign exchange earnings. It will ensure that shrimp production does not harm the environment.

Quality Control Strategy

Aim : Ensure that all fish and fishery products marketed either for export or domestic consumption satisfy quality requirements cited in HACCP (Hazard Analysis and Critical Control Point) and other protocols – including traceability and social accountability.

The quality control strategy aims at guiding quality control in fisheries over the next 10 to 20 years. The first priority is to ensure that food safety requirements for export are met. The concerns of consumers and importing countries (relating to safety, social equity, the environment) must be met. The product must be traceable from source, to identify any deliberate attempts at contamination.

Human Resources Development Strategy

Aim: To strengthen the human resource capacity of the Department of Fisheries, its partners and primary stakeholders, to ensure that personnel at all levels have the knowledge, skills and techniques to enable them to make productive use of their potential.

The capacity of the Department to plan, organise, implement and monitor staff development is weak, because of the reliance on short-term development projects. Some elements of a human resources strategy to strengthen the DOF: The capacity within the Department of Fisheries, particularly its Training Wing, will be developed to coordinate all aspects of Human Resources Development in fisheries. All training will be coordinated by the Training Wing. A systematic Human Resources Development process will be developed and implemented so that DOF staff, clients and partners are able to meet the sector's challenges.

Two award winning young artists - above and below.

The Tsunami Inspires Child Art

The trauma of the tsunami has inspired some remarkable child art. Some 230 children from 70 schools of coastal Tamil Nadu and Maldives took part in five on-the-spot art contests organised by BOBP-IGO on the theme "Life after the tsunami". This photo essay describes the contests in words and pictures. The best paintings won certificates and cash awards and will also figure in a 2006 BOBP-IGO calendar.

How do children react to a catastrophe like the tsunami? What is its impact on youngsters with artistic sensibilities? How do they view their immediate environment and the world after the tsunami?

To find out, the BOBP-IGO organised on-the-spot art contests in August 2005 for school children in four cities of coastal Tamil Nadu — Chennai, Cuddalore, Nagapattinam and Kanniyakumari – and another in Malé, Maldives during early September 2005. The theme: Life after the tsunami.

Each of the schools (12 in Chennai, nine in Cuddalore, 17 in Nagapattinam, 16 in Kanniyakumari, 15 in Malé) deputed their 3-4 best art students to take part in the contest. Here's some basic who-when-where data about the contests.

Chennai	Contest held on August 20, 2005, at the Chettinad Vidyashram, R A Puram, Chennai 600 028. 43 children from 12 schools took part – 21 children aged 11 to 13, 22 children aged 14-17.
Cuddalore	Contest held on August 27, 2005. 39 children from nine schools took part. 21 children aged 11 to 13, 18 children aged 14 to 17. Contest held at the Government Girls Higher Secondary School, Cuddalore Port.
Nagapattinam	Contest held on August 27, 2005. Sixty children from 17 schools took part. 28 children aged 11 to 13, 32 children aged 14 to 17. Held at the Adarsh Matric Higher Secondary School, Nagapattinam.
Kanniyakumari	Contest held on August 28, 2005. 48 children from 16 schools took part. 25 children aged 11 to 13, 23 children aged 14 to 17. Venue: Government Higher Secondary School, Vadasery.
Malé	Contest held on September 3, 2005, at the Malé English School. 32 Children from 15 schools took part. Three age categories here (12 children aged 11 to 12, 12 children aged 13 to 15, 8 children aged 16 to 17.)

Each on-the-spot art contest took about two hours. BOBP made available to every artist a drawing sheet and either a crayon pencil box (for the smaller age group) or a box of water-colour paintings (for the larger age group). The kids were free to bring their own equipment as well.

When the BOBP-IGO invited select schools to take part in the contest, they responded with alacrity. Parents of Tamil Nadu schools visited the BOBP to collect information about drawing sheets and art materials. Others browsed the BOBP-IGO website and asked about fishery resources.

Right: Snapshots of the young artists and the judges at work.

1 & 2. Maldives
3. Chennai
4. Judges and BOBP-IGO officials in the Maldives
5. Judges in Chennai.
6. Young artists with officials from Maldives and BOBP-IGO.
7. Chennai
8. Cuddalore
9. Kanniyakumari

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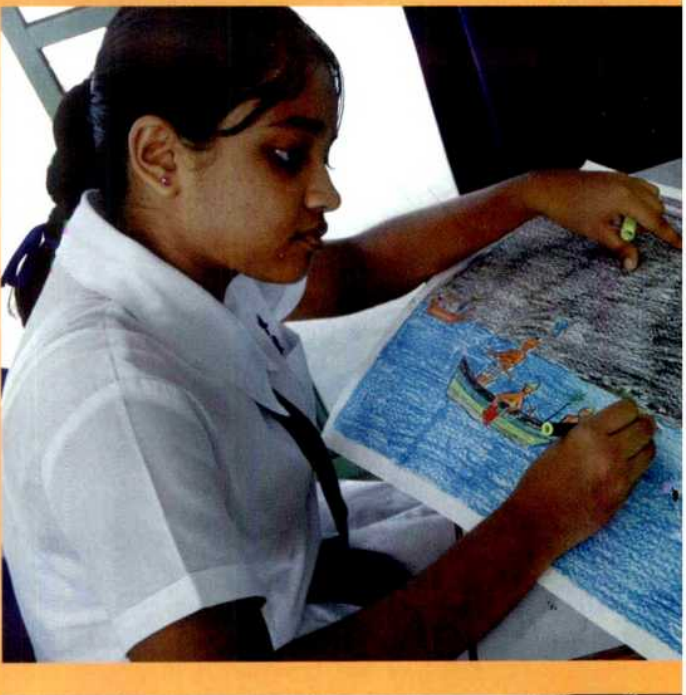

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The contest had the artists engrossed for 120 minutes – heads down, eyes afire with concentration, painting tools racing away. "A tsunami would not have disturbed me," one of them wisecracked later.

BOBP's artist S Jayaraj vetted the paintings and selected 15 from each center for final scrutiny by a panel of judges. For Tamil Nadu schools, the panel consisted of Dr George Conway (Chief of the Alaska Field Station of the National Institute for Occupational Safety and Health, USA), Principal of Chennai's College of Arts K Swamikannu, and art critic Chitra Mahesh from Chennai.

For the Maldives contest, the three judges were Mr Hussain Afeef (Senior Illustrator, Centre for Continuing Education), Mr Ahmed Naeem (Project Officer Trainee, National Art Gallery, Malé) and artist S Jayaraj.

Cash prizes were awarded to winners in all the categories. Prize-winners also received a printed certificate with a citation on one side and (to their surprise) their painting on the reverse, beautifully laminated.

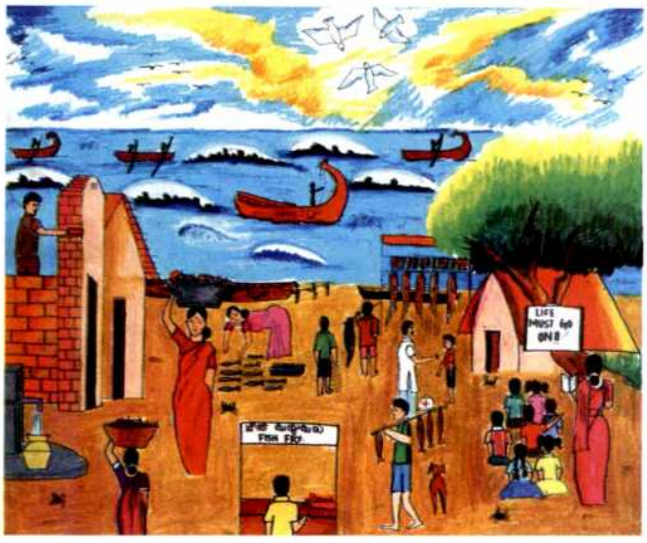
Certificate of Participation

The paintings

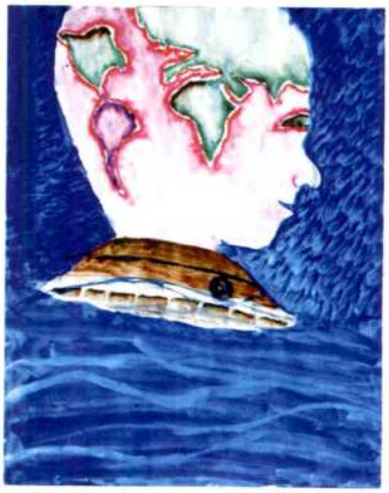
Under the theme "Life after the tsunami," the young artists came up with a slew of subjects, used ideas and symbols from nature, history and literature, and came up with poignant captions. Creativity unleashed!

One painting showed a child looking at the sea through the openings of a broken slate. Caption: "An affected mind is looking through a broken slate at the place where she lost her papa, mama, Barbie doll and school bag." One painting of a mass of corpses says "All it took was a few minutes. But it took all." Another painting depicted a vulture as the tsunami. It threatens "I'll come again." Caption: "A warning to marine resource poachers and exploiters".

Painting by Anjali Chandrashekar, Padma Seshadri Bala Bhavan School, Chennai.



Some other telling captions: "With courage in their minds and smiles on their faces". "Tsunami, a destroyer and creator", "He lost everything but didn't lose heart," "People at sea can see the light, people on land are yet to see the light," "An earthquake not only at sea, but also in my life." One intriguing painting showed a fisherman's head. His neck is an inverted boat. The transparent head shows maps of Africa and Asia! Caption: "The world of hope."



Painting by S Janani, Chettinad Vidyashram, Chennai.

Hope is also held out in a painting of rehabilitation — fishing activity, kids studying, houses being built. Caption: "With the tsunami past, our net's cast, let our joy last." Another positive portrayal" "Arise and awake to make a new world."

Several artists referred to the mother, either literally or metaphorically. "After the tsunami – he got everything except his lovable mummy." "A thousand helping hands – but who will give back my mother?" and "Mother sea! It's injustice!"

The feedback

The art contests truly captured the imagination of the young artists, also of the school principals and staff. Sample comment from an artist's mother "I have accompanied my daughter to some 100 art contests in different parts of India, but there was nothing more exciting than this one, none so well organised." A drawing master from Nagercoil requested the BOBP to conduct an art contest for drawing masters of Nagercoil and Kanniyakumari during the tsunami's anniversary day, December 26. Several principals urged repeat contests.

Most heartening was the imagination, the creative energy and the artistic talent displayed by the young artists. The BOBP-IGO's calendar of 2006 will reproduce the best of these paintings. Demand for it is zooming!

– Text by S R Madhu
Photographs by S Jayaraj

Focus on implementing existing international fisheries instruments, advises COFI meeting in Rome

A summary of important outcomes from the 26th Committee of Fisheries meeting held in Rome early this year, also from the Fourth Meeting of Regional Fishery Bodies that succeeded it.

The Committee on Fisheries (COFI), the FAO's top policy-making body in fisheries, did a wide-ranging review of fisheries and aquaculture issues and of the FAO's programmes at its 26th Session in Rome from 7 to 11 March 2005.

The Session was attended by 117 Members of COFI, by observers from three other FAO Member Nations, the Holy See, and one non-Member Nation of FAO, by representatives from six specialized agencies of the United Nations and by observers from 51 inter-governmental (IGOs) and international non-governmental organizations (NGOs). BOBP-IGO was also represented in the COFI.

The Committee commended the FAO on its fourth report on implementation of the Code of Conduct for Responsible Fisheries and associated instruments. It noted that the Code provided the basic framework for promoting sustainable fisheries and aquaculture. Member country representatives explained measures to implement the Code, including legislative enactments. The Committee urged further promotion of the Code's implementation, and additional guidelines in support of the Code, including one to implement the International Plan of Action for the Management of Fishing Capacity.

Critical to the sustained implementation of the Code was the need for institutional strengthening and human resources development in developing countries, especially in small-island developing states. Many members informed the Committee about their particular needs concerning assistance. The FAO was thanked for the training it provided on implementing the Code and the IPOAs.

Some Members suggested that FishCode might focus greater attention on human resource development and awareness building about the Code, especially at the "grass roots" level.

Some members said they faced a heavy reporting burden on the Code. A proposal was made that detailed in-depth analysis be undertaken every four years, alternating with a general overview report on implementation every two years. This decision is to be finalised at the next session of COFI.

The Committee expressed the view that many international fisheries instruments have been concluded since the 1992 United Nations Conference on Environment and Development (UNCED). Effort should now focus on implementing these instruments rather than on concluding new instruments. The Committee called for a "Decade of Implementation" for these instruments. Member countries were called upon to accept, ratify or accede to these instruments.

Many members said the ecosystem approach to fisheries management should be widely adopted, since fishing impacts not only the target resources but the ecosystem itself. However, others pointed out that while everyone agrees about the value of this approach, more understanding is needed on applying this approach practically.

Some members expressed concern at the slow rate of implementation of IPOA-Sharks. Many members provided information about illegal, unreported and unregulated (IUU) fishing in their countries and regions.

Participants at the COFI Meeting in Rome.

Some Members pointed out that there were linkages between IUU fishing and fishing overcapacity and that the management of overcapacity should be addressed on a global basis.

It was said that fishing vessels flying "flags of convenience" continued to undermine efforts to promote sustainable fisheries. In this connection, the Committee noted the positive comments about the 2003 FAO Expert Consultation on Fishing Vessels Operating under Open Registries and their Impact on Illegal, Unreported and Unregulated Fishing, and urged members operating open registries to implement the Consultation's recommendations as a matter of priority. Many members stressed the importance of effective fisheries monitoring, control and surveillance tools as primary defences against IUU fishing.

Many members referred to FAO's work on fisheries subsidies. A distinction was made between two types of subsidies. Those that supported fleet expansion, leading to stock degradation and unsustainable fishing, should be phased out. But subsidies that improved scientific information or benefited small-scale fishers and contributed to food security, poverty alleviation and sustainable utilisation should be continued. Members urged the FAO to undertake studies to determine the impact of subsidies on fishing capacity, IUU fishing and fisheries management generally.

The Committee expressed condolences to countries and families hit by the December 2004 tsunami and observed a minute of silence in memory of the victims of the tsunami. The Secretariat provided an overview of the impact of the tsunami that killed an estimated 300 000 people and caused damage of approximately US$ 7 billion. It was pointed out that the tsunami had its greatest impact on poor coastal fishing communities, many of which lost all or most of their livelihood assets.

Mr A Bhattacharya, Joint Secretary (Fisheries), India at the COFI Meeting.

The Secretariat expressed concern that rehabilitation could re-institutionalise factors leading to vulnerability and unsustainability. The Committee endorsed the FAO's medium-to-long term rehabilitation strategy for fisheries and aquaculture in the affected countries.

The Committee thanked India for offering to host the third session of the Sub-Committee on Aquaculture in 2006 despite the difficulties posed by the tsunami.

The Committee expressed concern at the proliferation of international fora addressing fisheries matters, some of which lacked a sound technical and scientific bases for discussion.

The Committee commended the COFI Secretariat for a document on enabling responsible small-scale fisheries. It noted that a range of issues should be addressed so that small-scale fisheries made a greater contribution to rural development, sustainable livelihoods, poverty alleviation and food security. Some Members recommended that small-scale fisheries be given greater consideration in the Code of Conduct for Responsible Fisheries through a specific Article or Appendix or through elaboration of additional Guidelines.

Mr G Piyasena, Director General, Department of Fisheries and Aquatic Resources, Sri Lanka at the COFI Meeting.

The attention of the Committee was drawn to the revised Code of Safety for Fishermen and Fishing Vessels and the Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels that had been prepared by FAO, the International Labour Organization (ILO) and the International Maritime Organization (IMO). The Committee welcomed the revised Code and Voluntary Guidelines and recommended the early publication by IMO of these documents.

The Committee stressed that COFI and FAO should continue to provide leadership and maintain an assertive role in fisheries.

Ministers who attended a Ministerial meeting on Fisheries on 12 March 2005 made a declaration about the tsunami. They urged donors and international financial institutions to "fulfil pledges they had made" about assistance to meet the effects of the tsunami.

The Ministers emphasised the need for fisheries and aquaculture rehabilitation to focus on rebuilding the livelihoods of fishers and fish farmers, providing adequate protection from this and other environmental threats, and improving sectoral efficiency, sustainability and governance.

The Ministers emphasised the need to "protect the rights of fishers and fishworkers, particularly those involved in subsistence and small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access to fishing grounds and resources of affected areas."

The Ministers emphasised the need "to rebuild and strengthen the capacity of affected fisheries sectors" in fishing abilities, data collection, scientific analysis, assessments of fisheries resources, and effective fisheries management. They said the capacity of communities and stakeholders to engage in this process should be enhanced.

The Fourth Meeting of Regional Fishery Bodies, 14-15 March 2005

Representatives from 29 Regional Fisheries Bodies (including the BOBP-IGO) took part in the Fourth Meeting of Regional Fishery Bodies (RFBs) in Rome on 14 and 15 March, 2005.

The meeting focused mainly on information exchange, administration and enhanced co-operation among RFBs.

Opening the meeting, Mr Ichiro Nomura, FAO Assistant Director-General of Fisheries, said that demands placed on RFBs had become heavier in recent years since the productivity of fish stocks had dwindled and fishing pressure increased. He recalled that the June 2004 Technical Consultation relating to IUU (illegal, unreported and unregulated) fishing had noted the key role of RFBs in combating IUU.

The meeting reviewed the decisions of the earlier COFI meeting (the 26th) that were relevant to RFBs.

- The FAO was requested to assist RFBs in issues concerning the biodiversity of the high seas.
- There was a COFI proposal to review the performance of RFBs in meeting the objectives of international instruments. COFI suggested that RFBs could be invited to take part in a meeting to develop parameters for such a performance review. There could perhaps be an expert consultation followed by a technical consultation.
- The COFI meeting recognised that there are many deficiencies in fisheries governance at a global level – for example in areas related to overcapacity, IUU fishing, catch allocaton, and the behaviour of non-contracting parties. RFBs may require capacity-building to deal with such issues.

Mr Jean-Francis Pulvenis, Director of the Fishery Policy and Planning Division of FAO described the perceived role of RFBs. Ms Judith Swan mentioned several fisheries circulars concerning RFBs. She said that recent international instruments had enhanced the role of RFBs in fisheries management.

The meeting noted the major role of RFBs in implementing the four International Plans of Action and the FAO strategy for improving action on the status and trends of capture fisheries.

The question of raising the public profile of RFBs was discussed. Some suggestions: Special events, use of electronic media, promotion of linkages between and among RFBs, websites.

Discussing IUU fishing, the meeting described it as a large and complex problem unlikely to be solved in the near future. "It has multiple drivers ranging from criminal greed to ignorance. It is global in effect and will require global as well as multiple solutions." The Meeting recognised that IUU fishing undermines the management efforts of RFBs. Additional information was therefore needed to make management effective.

Mr Kevern Cochrane, Senior Fisheries Resource Officer of FAO delivered a presentation on ecosystem approaches to fisheries management (EAFM). The meeting discussed individual RFB activities and challenges relating to EAFM. The following suggestions were made to incorporate EAFM principles into RFB initatives:

- Building awareness on EAFM among RFB member countries
- Evaluating existing management initiatives which may have embedded EAFM concerns
- Identifying weaknesses in existing management initiatives and practices, and strategies to strengthen the initiatives.

Mr Ellik Adler (UNEP Regional Seas Programme Coordinator) said that his programme worked with partner organisations. He discussed the question of stronger ties between UNEP and RFBs, and proposed seven areas for positive co-operation.

The meeting discussed the structure for the next meeting of RFBs. It was agreed that it should take up fewer topics with more in-depth discussion.

Regional Fishery Bodies,
Intergovernmental
Organizations,
National Governments
Organes régionaux
des pêches, organisations
intergouvernementales,
gouvernements nationaux
Órganos pesqueros
regionales, organizaciones
intergubernamentales,
gobiernos nacionales
区域渔业机构、
政府间组织、
国家政府
أجهزة المصايد الإقليمية،
المنظمات الحكومية الدولية،
الحكومات القطرية
COFI

BOBP-IGO exhibits on the Tsunami, at the COFI Meeting.

"The State of World Fisheries and Aquaculture" is the FAO's authoritative biennial summation of what's happening to the world in these two disciplines. The latest document, for 2004 sums up global trends for 2002 and gives an idea of preliminary trends for 2003. Here are glimpses into this document.

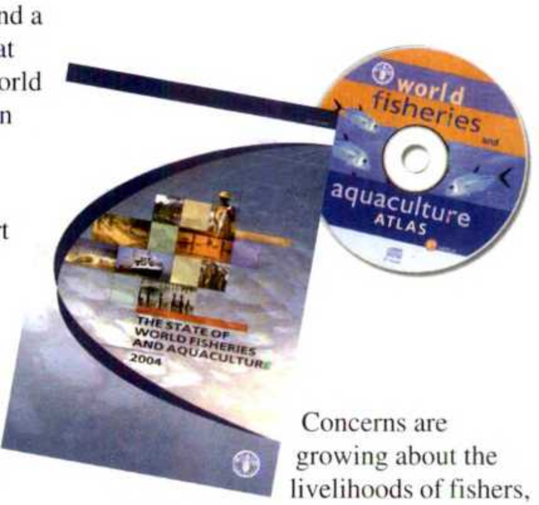
The State of World Fisheries and Aquaculture 2004

This 153-page report, and a complimentary CD that contains an atlas on world fisheries and aquaculture, is in four parts.

Part 1 is a review of world fisheries and aquaculture. Part 2 discusses selected issues facing fishers and aquaculturists. Part 3 highlights special FAO studies. Part 4, an "outlook" for the future, has been summarized and presented elsewhere in this issue of ***Bay of Bengal News.***

The report was a co-operative effort of FAO Fisheries Department staff and some external contributors. A three-member team led the effort, FAO management staff provided direction.

Introducing the report, FAO's Assistant Director-General for Fisheries Ichiro Nomura says that trends observed at the end of the 1990s are continuing. While capture fisheries production is stagnating, aquaculture output is expanding.



Concerns are growing about the livelihoods of fishers, also about the sustainability of commercial catches and aquatic ecosystems.

Part I: Review of World Fisheries and Aquaculture

This wide-ranging review covers the entire gamut of fisheries and aquaculture. It examines past history, recent trends, current status and future prospects.

World fishery production in 2003 decreased slightly from that in 2002 – from 133 million tonnes to 132.2 million tonnes. However, the amount of fish for human consumption increased from 100.7 million tonnes to 103 million tonnes; the per capita supply was maintained. There was a slight decrease in capture fisheries; but other food fisheries and aquaculture made up for this decrease.

China was by far the largest producer, with a reported fisheries production of 44.3 million tonnes in 2002 (16.6 and 27.7 million tonnes from capture fisheries and aquaculture, respectively). But it is believed that the production statistics for China is an overestimate; this problem has existed since the early 1990s. Because of the importance of China and the uncertainty about its production statistics, China is discussed in the report separately from the rest of the world (a practice also adopted in previous issues of the report).

Information available confirms that despite local differences, the global potential for marine capture fisheries has been reached. More

rigorous plans are needed to rebuild depleted stocks and prevent the decline of those being exploited at their maximum potential or close to it.

By contrast, global production from aquaculture continues to grow, in terms of both quantity and its relative contribution to the world's supply of fish for direct human consumption. Production in 2002 (51.4 million tonnes, with China accounting for 71 percent) was 6.1 percent higher than in 2000.

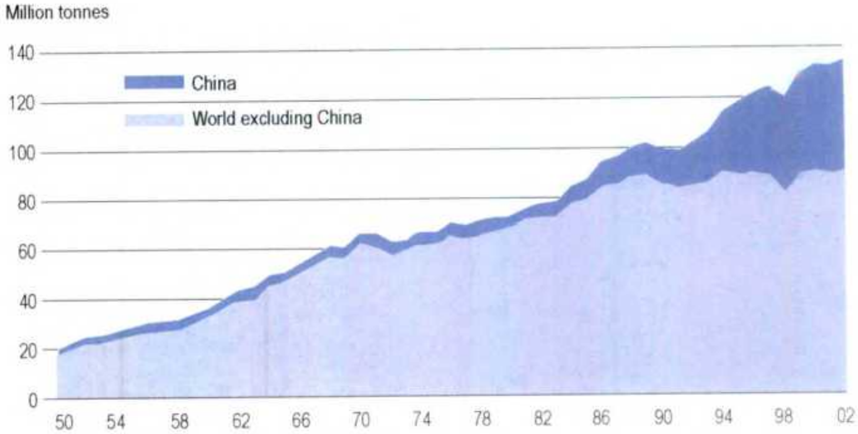
Aquaculture production of food fish continues to be mainly (57.7 percent) from freshwater. Developing countries accounted for 90.7 percent of production in 2002, consisting of predominantly herbivorous/omnivorous or filter-feeding species.

In 2002, about 76 percent (100.7 million tonnes) of estimated world fisheries production was used for direct human consumption. The remaining 24 percent was used for non-food products, in particular the manufacture of fishmeal and oil.

Total capture fisheries production

In 2002, total capture fisheries production amounted to 93.2 million tonnes, slightly above production in 2001. Preliminary estimates indicate that global marine catches decreased in 2003 by about 3 million tonnes compared with 2002.

The list of top 10 capture fishery countries has not changed since 1992. In 2002, their cumulative catches represented 60 percent of the world total, with China and Peru still leading the ranking in both 2001 and 2002.



World capture and aquaculture production.

Marine capture fisheries production in 2002 was 84.5 million tonnes, representing a decline of 2.6 percent with respect to 2000. The Northwest and Southeast Pacific are still the most productive marine fishing areas, although total catches in these two areas decreased by 1.8 and 2.0 million tonnes in 2002 compared with 2000 levels. Catches decreased substantially from 2000 levels in the Eastern Central and Southwest Atlantic. By contrast, catches were still growing in the tropical regions of the Indian and Pacific Oceans, where catches of large (mainly tuna) and small pelagic species continued to increase.

Anchoveta ranks as the most caught marine species (9.7 million tonnes in 2002). Total catches of tuna and tuna-like species exceeded 6 million tonnes for the first time in 2002, accounting for 11 percent of the total value of landings for consumption. Increased catches were also realized from tropical species such as skipjack (the third global species in 2002) and yellowfin tunas. Catches of oceanic species occurring principally in high seas waters continued to increase.

Total catch production of both marine crustaceans and molluscs declined slightly from their 2000 peak over the following two years.

Fishers and Fish Farmers

In 2002, fishery and aquaculture production activities directly employed an estimated 38 million people, a marginal increase over the previous year's figure. Of these, more than one-third were employed full-time and the rest were part-time and occasional workers. Fishing in marine and inland waters accounted for 75 percent of the total number of workers, while aquaculture employed the remaining 25 percent. The highest numbers of fishers and aquaculture workers is in Asia (87 percent of the world total).
It is apparent that, in most fishing nations, capture fisheries is losing ground to aquaculture as an employer. Since 2000, however, employment in aquaculture has started to level off in some countries.

In many industrialized countries, notably Japan and Europe, employment in fishing and in related land-based professions has been declining for several years. Reasons: lower catches, programmes to reduce fishing capacity and higher productivity resulting from technological progress.
The fishing workforce in most developed economies is advancing in age, mainly because of the profession's decreasing attractiveness to younger generations.

But fishing is still an attractive profession for many people in some areas. In China, an estimated 25 million people work in various fisheries occupations. Part-time fishers might work seasonally in fishing and return to their village during the summer, or undertake a mix of agriculture and fish farming. The average earnings from fishing can be higher than those from agricultural farming, although jobs in manufacturing and other economic sectors are generally more rewarding than those in agriculture and fishing.

World inland capture fisheries production

Total catches from inland waters remained stable at around 8.7 million tonnes in the 2000–02 period. Africa and Asia contributed about 90 percent of global production in 2002.

The bulk of world inland fisheries production (68.1 percent) came from developing countries other than China and only 6.1 percent from developed countries. In 2002, not one developed country was among the top 10 world producers.

Reporting of inland catch by species group remains very poor for many countries and does not permit detailed analysis of trends in catch composition. China accounts for the great majority of reported world catches of freshwater crustaceans (94 percent) and molluscs (87 percent).

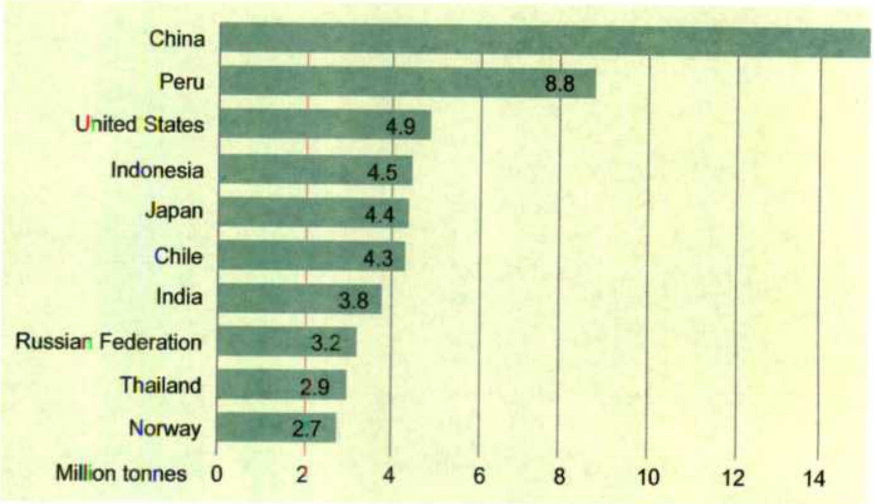
Aquaculture Production

The contribution of aquaculture to global supplies of fish, crustaceans and molluscs continues to grow. It increased from 3.9 percent of total production by weight in 1970 to 29.9 percent in 2002. Worldwide, the sector has grown at an average rate of 8.9 percent per year since 1970 (against 1.2 percent for capture fisheries).

Production from aquaculture has greatly outpaced population growth, with the world average per capita supply from aquaculture increasing from 0.7 kg in 1970 to 6.4 kg in 2002.

In 2002, total world aquaculture production (including aquatic plants) was reported to be 51.4 million tonnes by quantity and US$ 60.0 billion by value. In 2002, Asian countries accounted for 91.2 percent of the production quantity and 82 percent of the value. Of the world total, China is reported to produce 71.2 percent of the total quantity and 54.7 percent of the total value of aquaculture production.

Most aquaculture production of fish, crustaceans and molluscs continues to come from the freshwater environment (57.7 percent by quantity and 48.4 percent by value). Mariculture contributes 36.5 percent of production and 35.7 percent of the total value. Although brackishwater production represented only 5.8 percent of the aquaculture production quantity in 2002, it contributed 15.9 percent of the total value, reflecting the prominence of high-value crustaceans and finfish.



Marine and inland capture fisheries: top ten producer countries in 2002.

During this period, China's fresh water aquaculture production reportedly increased at an average annual rate of 11.1 percent, compared with 6.9 percent for the rest of the world. Similarly, reported Chinese aquaculture production in marine areas increased at an average annual rate of 10.9 percent compared with 5.5 percent for rest of the world.

Unlike terrestrial farming systems, where the bulk of global production is based on a limited number of animal and plant species, over 220 different farmed aquatic animal and plant species were reported in 2002.

Aquaculture production of fish, crustaceans and molluscs in developing countries has proceeded at an average annual rate of 10.4 percent since 1970, as against 4 percent per year in developed countries. In developing countries other than China, production has grown at an annual rate of 7.8 percent.

The Fishing Fleet

The vast majority of the world fishing fleet is concentrated in Asia

Freshwater carp farming in Bangladesh.

(about 85 percent of total decked vessels, 50 percent of powered undecked vessels and 83 percent of total non-powered boats). After years of expansion of the world fishing fleet until the late 1980s and early 1990s, the number of decked vessels worldwide has remained fairly stable around 1.3 million. In addition, the world fleet engaged in fishing in marine and inland waters comprised about 2.8 million undecked vessels.

The average age of the larger marine fishing vessel fleet segment has continued to increase. The number of "young" vessels (less than 10 years old) has fallen in 2003 to 13 per cent from 30 per cent the previous year.

Fishing is considered to be one of the most dangerous occupations. The aging fishing fleet raises concerns over the safety of both vessels and crew. Standards of accommodation and crew conditions on board very old vessels do not conform to current minimum requirements for newly built vessels.

It is expected that the construction of larger fishing vessels will increase over the next ten years. FAO, the ILO and the International Maritime Organization (IMO) are finalizing major revisions of the Code of Safety for Fishermen and Fishing Vessels and of the Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels.

Fishery resources

Of the top 10 species that account for about 30 percent of the world capture fisheries production, seven belong to stocks that are fully exploited or overexploited. Major increases in catches cannot therefore be expected from these. Two species that could probably support higher fishing pressure in some areas are skipjack tuna and chub mackerel.

All information available tends to confirm old FAO estimates that the global potential for marine capture fisheries is about 100 million tonnes, of which only 80 million tonnes are exploitable. It also confirms that overall, this limit has been reached. More rigorous stock recovery plans are needed to rebuild stocks that have been depleted by overfishing and to prevent the decline of those being exploited close to their maximum potential.

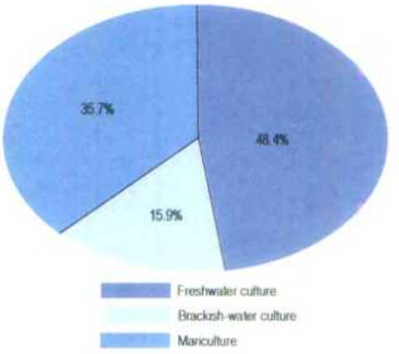
Some of the most important management concerns today are the effects of fisheries on habitats, on marine communities, and ecological interactions (such as predator - prey relationships), as well as those of land-based activities and climatic changes on fisheries.

The precautionary approach to fisheries, recommended by UNCED, the United Nations Fish Stocks Agreement and the FAO Code of Conduct for Responsible Fisheries, needs to be implemented in practice.

Inland fisheries

Unlike the major marine fish stocks, inland fish stocks are less well defined and occur over much smaller geographical areas, such as individual lakes, rice fields or rivers, or over vast areas such as transboundary watersheds in areas that are difficult to access. These factors make it costly to monitor the exploitation and status of fish stocks. In fact, very few countries can afford to do so. Result: a majority of countries report only a small fraction of their catch of inland fisheries by species. Thus FAO is not in a position to make global statements on the status of these resources. The threat to inland fishery resources from habitat alteration, degradation and unsustainable fishing, reported earlier, continues.

Aquaculture Environments



But the status of some inland fishery resources has been enhanced in many areas through stocking programmes, the introduction of alien species, habitat engineering and habitat improvement. In many developing areas, especially in Asia, rice fields and irrigated areas are being enhanced to increase the production of aquatic biodiversity other than rice, and to improve the nutritional status of rural households.

Fish utilization

Utilization of fish production shows marked continental, regional and national differences. In 2002, more than two-thirds of fish used for

Ribbon fish catch at a landing centre in India.

human consumption in Europe and North America was in frozen or canned form. In Africa and Asia on the other hand, the share of fish marketed live or fresh was high. The sale of live fish to consumers and restaurants is especially strong in Southeast Asia and the Far East.

Fish Consumption

In 2002, average apparent per capita consumption of fish, crustaceans and molluscs worldwide was estimated to be about 16.2 kg, 21 percent higher than in 1992 (13.1 kg). This growth is largely attributable to China, whose estimated share of world fish production increased from 16 per cent in 1992 to 33 percent in 2002. Per capita fish supply in China in 2002 was about 27.7 kg.

Overall, fish provides more than 2.6 billion people with at least 20 percent of their average per capita intake of animal protein.

Fish consumption is distributed unevenly around the globe; there are significant differences among countries, with per capita apparent consumption ranging from less than 1 kg per capita to more than 100 kg. Geographical differences are also evident within countries, with consumption usually being higher in coastal areas.

Fish Trade

In 2002, total world trade of fish and fish products increased to US$ 58.2 billion (export value), a 5 percent increase over figures for 2000 and a 45 percent increase since 1992. In terms of quantity, exports were reported to be 50 million tonnes in 2002, a slight decrease (1 percent) from the 2000 level. The quantity of fish traded has remained stagnant over the last few years, following decades of strong increases. Many of the economic factors responsible for the high growth in world fishery trade in the previous decade have now diminished in importance.

In 2002, China overtook Thailand for the first time to become the world's main exporter of fish and fish products, with exports valued at an estimated US$ 4.5 billion. Thailand ranked second as exporter of fish and fish products (US$ 3.7 billion), Norway was the third largest exporter (US$ 3.6 billion), followed by the United States (US$ 3.3 billion), Canada (US$ 3.0 billion), Denmark (US$ 2.9 billion) and Viet Nam (US$ 2.0 billion).

Mainstreaming fisheries into national development and poverty reduction strategies

The report highlights the important role of fisheries in the alleviation of poverty and the achievement of food security in many parts of the world. Fishery products contribute towards 15-16 percent of global animal protein intake and more than 38 million people are directly engaged in fishing and fish farming as a full time or part time occupation. Therefore, efforts should be made to ensure the effective integrations of fisheries into key national policy documents relating to poverty reduction and rural development.

World fish imports touched a record US$ 61 billion in 2002. Developed countries accounted for about 82 percent of the total value of imports of fish products. Japan was once again the largest importer of fish and fish products (US$ 13.6 billion), with a 22 percent share of the world import value in 2002. The United States was the second largest importer (US$ 10 billion). Spain (US$ 3.9 billion), was the third largest importer, followed by France (US$ 3.2 billion), Italy (US$ 2.9 billion), Germany (US$ 2.4 billion) and the United Kingdom (US$ 2.3 billion).

Exports from developing countries (28 million tonnes) were around one-quarter of their combined production. The share of developing countries in total fishery exports was 49 percent by value and 55 percent by quantity.

Although there is a strong trade in fish and fishery products among the more developed economies (mostly demersal species, herring, mackerel and salmon), trade tends to flow from the less-developed to the more-developed countries (mainly tuna, small pelagics, shrimps and prawns, rock lobsters and cephalopods). In 2002, about 74 percent of the import value was concentrated in three main areas: the EU, Japan and the United States.

Despite a slight decline in exports, shrimp continues to be the main fish commodity traded in value terms, accounting for about 18 percent of the total value of internationally traded fish products in 2002.

During 2003, shrimp imports in several key markets reached new highs. Sales to the world's largest shrimp market, the United States, exceeded 500 000 tonnes for the first time – 17 percent higher than imports in 2002. But annual imports of shrimp into Japan during 2003 declined by 6 percent compared with the previous year. In Europe, shrimp imports increased in 2003, as a result of a strong euro and competitive international prices. Brazil, China, Ecuador, India, Thailand and Viet Nam are to pay higher duties for dumping in the United States, which will create some problems for their sales there in the short-term. Prices remained low during most of 2003, and there are no indications of an increase in 2004.

Products derived from aquaculture production accounted for an increasing share of the total international trade in fishery commodities, with an estimated 22 percent of the export quantity.

For many economies, and in particular for developing nations, trade in fish represents a significant source of foreign currency earnings, in addition to the sector's important role in income generation, employment and food security.

Some major issues concerning international trade in fish products in recent years include changes in quality and safety control measures, the introduction of new labelling requirements, chemical residues in aquaculture products; the general public's concern about overexploitation of certain fish stocks, the sustainable development of aquaculture, international trade negotiations in the WTO.

With the entry of China into the WTO in 2001, all major fishery countries other than the Russian Federation and Viet Nam (which have started negotiations to become members) are now members of the organization.

Part II: Selected issues facing fishers and aquaculturists

The report discusses some select issues in fisheries and aquaculture — problems in capture-based aquaculture; labour standards in the fishing sector; fisheries management and CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), trade implications of fish species and fish product identification; recovery of depleted stocks; governance and management of deep-water fisheries.

For each issue, the report summarises the issue, possible solutions or action required, action taken so far and future perspectives.

Tuna landings in Malé fishing harbour.

Example: On capture-based aquaculture (CBA), the report points out that it accounts for about one-fifth of the total food production through aquaculture. CBA is an interface between capture fisheries and true aquaculture, and provides local coastal communities with an alternative livelihood. CBA provides opportunities for developing low-hazard good-quality products that satisfy codes of conduct and practice. But certain environmentally questionable management practices need to be tackled, such as the use of wild seed, the use of raw fish as feed, devising cost-effective environmental assessment systems to ensure good site selection, a practical method for monitoring aquaculture production.

Positive developments include hatchery-reared seed which limits the ecological impact of wild seed, and the partial substitution of raw fish by manufactured diets. The report says it is critical for the future to develop fry production in hatcheries on an economically viable commercial-scale; and to refine environmentally sound grow-out technologies. "Failure to address these could have severe consequences for the future of both aquaculture and some capture fisheries."

Part III: Highlights of special FAO studies

The report throws light on some special studies carried out by the FAO on significant issues in fisheries and aquaculture. These constitute useful reading for planners and decision-makers. The studies are

- Scope of the seaweed industry
- Global aquaculture outook: an analysis of production forecasts to 2030
- Impacts of trawling on benthic habitats and communities
- Measurement of fishing capacity
- Re-estimating discards in the world's marine capture fisheries
- Fisheries subsidies
- Small-scale fisheries in African freshwaters

In its study on "Global aquaculture outlook," the report says the aquaculture sector could replicate the expansion of agriculture. "Much will depend on the realism of assumptions used to support projected targets." The report urges policy-makers formulating development plans for aquaculture to place a stronger emphasis on the rationale supporting their production forecasts. Such an emphasis will enable better sector development planning and progress monitoring."

The Fisheries Outlook for the Future

What is the future for fisheries and aquaculture? In the short-term and the long-term? Here's some sophisticated crystal-ball gazing. It is based on the last chapter "Outlook" from the FAO's report "The State of World Fisheries and Aquaculture 2004".

Will capture fisheries suffer from an implosion? Will aquaculture be stopped in its tracks? Will experts remedy the adverse impacts of aquaculture and ensure smooth and rapid growth?

The authors of the final chapter (cryptically titled "Outlook") of the FAO report "The State of World Fisheries and Aquaculture 2004" point out, "No one has the exact answers. No one can predict with precision what will happen to capture fisheries or aquaculture, particularly when the question is projected several decades into the future. But … reasonable predictions can be made – at least for the short-term."

To predict the short-term, the authors review global changes in attitudes to production and consumption of fish. How will these impinge on the state of marine resources as well as on growth in population and income?

As for the medium-to-long term, the authors take up two computer-based simulations of the future for global fisheries and aquaculture towards the years 2010, 2015 and 2020.

The Short-term (The Coming Decade): Constraints and Opportunities

Analysing the outlook for the coming decade, the authors say that how capture fisheries and aquaculture develop depends on how fishers and fish farmers react to evolving commercial and technical opportunities on the one hand, and to legal and environmental constraints on the other. Some observations:

- Demand for fish will expand as populations and incomes grow. But this increase will be relatively slow in developed countries (because populations here will grow slowly), and faster in developing countries (where populations will grow quickly).
- Market liberalization will add to pressure on wild fish stocks of developing countries, particularly for species much in demand in international markets.
- Access to natural resources is being reduced for fishers in capture fisheries. Limitations (such as licensing requirements and environmental impact assessments for new facilities) are spreading to aquaculture as well.
- Marine fish landings of conventional species are likely to remain at the current figure of 80 to 90 million tonnes.
- In advanced countries, old fishers are leaving the profession more quickly than they are being replaced. This decline in fishers may help the economic viability of capture fisheries and enable an inflow of new vessels and younger fishers.
- In developed countries, fisheries policies will become less lenient. Subsidies directly linked to fisheries capacity and effort will be curtailed, and fishers may be asked to pay for government services and for the right to fish. This will increase the costs of fishing and eliminate marginal fishing enterprises, increase fish prices and stimulate aquaculture production.
- In developing countries, artisanal and small-scale fishers may find opportunities in economic growth to graduate from subsistence

Fish spread for auction, Bangladesh.

mode to entrepreneurial mode. Economic growth may also draw some part-time fishers away from fisheries into urban employment. This factor may help to make fisheries more sustainable by reducing over-exploitation.

- As real wages increase in China, south and southeast Asia (which together account for 90% of world aquaculture output today), aquaculture production, capital and know-how may spread to Africa and Latin America, where costs of production overall may be lower.
- The search for new and high-value culture species will continue. Some success will no doubt be achieved by 2015.

2015 and beyond: future scenarios for world fisheries and aquaculture

Two studies undertaken by the FAO and the International Food Policy Research Institute (IFPRI) use quantitative computer-based simulations to project the future in 2015 and 2020. (The IFPRI study was summarised in ***Bay of Bengal News,*** September 2004).

According to the **FAO study** ("Future prospects of fish and fish products: medium-term projections to the years 2010 and 2015"), total world fish production will increase from 129 million tonnes in 1999-2001 to 172 million tonnes in 2015. Capture fishery production will stagnate, while aquaculture production will increase substantially, though at a lower rate than at present. Of the expected increase of 43 million tonnes (between 1999-2001 and 2015), 73 percent will come from aquaculture. In 2015, aquaculture will account for 39 percent of global fish production (up from 27.5 percent in 1999-2001.)

- Developing countries will increase their share of world fish production from 75 per cent in 1999-2001 to 81 percent by 2015. The share of developed countries will fall from about 25 per cent to 19 percent by 2015. Capture fisheries production in developed countries is expected to stagnate or even decline in absolute terms during the projection period.
- Developing countries will increase their net export of fish and fishery products from 7.2 million tonnes in 1999-2001 to 10.6 million tones by 2010. This figure will go down slightly in 2015 to 10.3 million tonnes, because of increased domestic demand.
- Developed countries will reduce current net imports of fish and fishery products from 11.3 million tonnes in 1999-2001 to 10.6 million tonnes by 2010 and 10.3 million tonnes by 2015.
- There will be a global shortage of supply of fish in future. The overall effect will be a rise in the price of fish. Prices for all types of fish will increase in real terms by 3.0 and 3.2 per cent by 2010 and 2015 respectively.
- On average, people will be consuming more fish in 2015, but increases henceforth are likely to accrue more slowly than in the past two decades.

The IFPRI study ("Fish to 2020: supply and demand in changing global markets") projects supply, demand and trade of fish from 1997 to 2020 in response to different policy and environmental scenarios for the fish sector. The study draws on FAO statistical databases, uses an IFPRI model modified to deal with food fish, and discusses six scenarios.

The study highlights five major structural shifts now under way, which will become more pervasive between now and 2020.

1. Developing countries (particularly those from Asia) will dominate food fish production from both capture fisheries and aquaculture. Stocks that are not fully exploited will be fished more heavily.
2. Consumption will increase in developing countries by 1.9 percent annually, or by 2.0 percent if China is included. It

Comparisons of simulation results

	Simulation target year					
	2000	**2010**	**2015**	**2020**		**2030**
Information source	**FAO statistics** [a]	**SOFIA 2002** [b]	**FAO study** [c]	**SOFIA 2002** [b]	**IFPRI Study** [c]	**SOFIA 2002** [b]
Marine capture	86	87		87	-	87
Inland capture	9	6		6	-	6
Total capture	95	93	105	93	116 [2]	93
Aquaculture	36	53	74	70	54	83
Total production	131	146	179	163	170 [3]	176
Food fish production [1]	96	120		138	130	150
Percentage used for food	73 %	82 %		85%	77%[4]	85%
Non-food use	35	26		26	40 [5]	26

Note: All figures - other than percentages - are in million tonnes and rounded.

[1] *Aquatic animals other than reptiles or mammals, excluding quantities reduced in fishmeal and oil.*

[2] *Calculated by the authors from total production minus aquaculture.*

[3] *Calculated by the authors by adding food fish to fishmeal production*

[4] *Calculated by the authors by comparing food and non-food use.*

[5] *Calculated by the authors by multiplying fishmeal production forecasts by five.*

Sources:

[a] *Based on latest statistics of the FAO Fishery Information, Data and Statistics Unit.*

[b] *FAO. 2002. The State of World Fisheries and Aquaculture 2002. Rome.*

[c] *Op. Cit., footnote 90, p.146, The State of World Fisheries and Aquaculture, 2004.*

will remain static in developed countries (0.2 percent) and sub-Saharan Africa.

3. South-south trade will increase with the emergence of urban middle classes. Domestic producers in developed countries will gradually leave the sector. Fish will increasingly become a high-value commodity. The shift in traded products from frozen low-grade whole fish to value-added products will continue.
4. Environmental controversies will continue. Sustainability concerns will increase. These will spur environmental regulations and institutions, initially in developed countries, later in developing countries. Overfishing will remain a major concern.
5. Fisheries and aquaculture technology will address new challenges in both the north and the south — such as reducing fish meal and fish oil requirements in aquaculture; reducing the environmental impacts of intensive aquaculture; and utilizing information technology for improved fishery management.
6. Institutional development in the sector will be necessary – for reducing poverty through fisheries and aquaculture development, as well as for improving environmental sustainability and food safety

Comparing the FAO and IFPRI projections

The two studies point to similar futures, but there are some significant differences. These relate to the total volume produced and consumed, to the relative roles of capture fisheries production and aquaculture, and to trends in real prices for fish.

- The FAO study is more optimistic in terms of fish supplies and consumption. It envisages a total production of 179 million tonnes in 2115, while the IFPRI study (base scenario) foresees a production of only 170 million tonnes by 2020.
- The IFPRI study expects capture fisheries landings to expand significantly (to 116 million tonnes in 2020), the FAO study foresees a contribution of only 105 million tonnes in 2015.
- The most dramatic difference is in aquaculture production. IFPRI expects only about half the growth foreseen in the FAO study (74 million tonnes by 2015 – FAO; 54 million tonnes by 2020 – IFPRI).

The FAO and IFPRI models to simulate future scenarios have important similarities. They both use international trade as the mechanism to equalize world supply and demand of fish. They both consider developments in industries that produce substitutes. The reasons for the differences in results spring from basic assumptions – such as sensitivity to prices, the physical possibilities of increasing capture fisheries production, the "reactivity" of aquaculture to developing opportunities.

The FAO study assumes that consumers will not have to sharply reduce fish consumption following fall in fish production and higher prices, because aquaculture will meet the gap in supply.

The IFPRI study is less optimistic than the FAO study about aquaculture increasing production rapidly. It does not expect the fisheries sector as a whole to expand output as rapidly as the FAO study indicates.

A common denominator of both studies is that **during the next three decades,** the world will not have to face any fish shortages; prices will be relatively stable.

The authors of "Outlook" say that the FAO and IPPRI simulations seem to indicate gradual and uniform evolution of the fisheries sector. But the world of reality is likely to differ from the world of simulations. Though globalization tends to lead to uniformity, the world of fisheries in future will remain diversified, thus:

1. The picture will be positive in countries with "sufficient economic and institutional capacity". Fishing capacity will be significantly reduced, stocks will rebuild, environmental impacts will be reduced. A number of fishers will find other forms of livelihood.
2. The picture will be one of stagnation or "controlled degradation" in countries where reform is too little, too late. Rebuilding will be uncertain, overcapacity will be rampant. Catches will stagnate or drop. Fishers will face hardships because of livelihoods becoming unsustainable.
3. The picture will be one of crisis in countries where governance is poor. Developments such as droughts and war will escalate pressure on resources, pushing more fisheries toward decline. Catches will fall in quality and value. Fishing communities will face hard times.

FAO's International Plans of Action

A summary of four International Plans of Action which are "voluntary instruments" within the framework of the Code of Conduct for Responsible Fisheries. A booklet that spells out rules and measures is available for each IPOA.

The Code of Conduct for Responsible Fisheries (CCRF) was adopted in 1995 by more than 170 members of the FAO. The Code is a collection of principles, goals and action elements, designed to help conserve and manage the world's fisheries. It represents a global consensus or agreement on a wide range of fisheries and aquaculture issues.

Four International Plans of Action (IPOAs) have since been elaborated within the framework of the CCRF. They are "voluntary instruments" which apply to all States and entities and to all fishers. Here's a summary of the four IPOAs.

International Plan of Action for the Conservation and Management of Sharks

This IPOA highlights the pressures faced by shark populations and aims to ensure their conservation and management. The plan applies to States in whose waters sharks are caught by domestic or foreign vessels, or States whose vessels catch sharks on the high seas. Such states should adopt a national plan of action to assess threats to shark populations, and implement strategies for sustainable catches. The Plan includes guidelines for a shark plan, and sets out an outline for a shark assessment report.

The IPOA Sharks came into being in 1998, following a Technical Working Group meeting held in Tokyo in April 1998, and a final meeting in Rome held in October 26-30, 1998. IPOA Sharks describes the nature and scope of the problem, sets out the Plan's objective, and outlines principles and procedures for implementation.

The IPOA points out that for centuries, artisanal fishermen have sustainably fished coastal waters for sharks. But during recent decades, modern technology has increased effort and yield, and expanded the areas fished as well. Shark populations are therefore under tremendous pressure. Further, sharks take a long time to recover from overfishing (the reasons being low biological productivity because of late sexual maturity and few offsprings). The wide distribution of sharks and migration over a long area makes international co-operation in shark interventions imperative.

IPOA Sharks urges States that directly or indirectly facilitate shark fishing to evolve a shark plan in consultation with experienced regional fisheries organisations. Each State would be responsible for developing, implementing and monitoring its own plan. A typical shark plan should aim to

- ensure sustainable shark catch for direct and non-directed fisheries;
- assess threats, protect habits and ecosystems and introduce sustainable strategies;
- pay special attention to vulnerable and threatened shark stocks;
- involve all stakeholders in research, management and education; and
- enable species-specific collection of biological, trade and catch data.

Every four years the Shark Plan must be evaluated to determine efficient and cost-effective strategies. States that do not have a Shark Plan should periodically check their fisheries for changes in catch and landing data.

IPOA Sharks provides the outlines of a sample Shark Plan and a sample Shark Assessment Report to help member-States.

International Plan of Action for the Management of Fishing Capacity

This IPOA highlights issues related to excess fishing capacity in world fisheries, an increasing concern in the context of the CCRF. Excess fishing capacity contributes substantially to overfishing, the degradation of marine fisheries resources, decline of food production potential and significant economic waste.

The IPOA on management of fishing capacity aims to eliminate excess fishing capacity and ensure sustainable use of fishery resources. This IPOA was initiated by the Committee on Fisheries (COFI), implemented through a Technical Working Group organised by the FAO, and finalised in Rome at a meeting held from October 26 to 30, 1998.

Some of the guidelines for managing fishing capacity, based on the CCRF.

- States should implement the IPOA on management of fishing capacity directly or in co-operation with other States, regional fisheries/inter-governmental organisations. They should inform the FAO about action taken. FAO will provide regular updates about IPOA implementation.
- Plans should be implemented in three phases – assessment and diagnosis; adoption; and adjustment.
- Plans should consider all factors affecting capacity in national and international waters.
- The plans should promote conservation of marine ecosystems and sustainable use of fish stocks. They should focus on areas where overfishing is an established fact, and use only technologies that are environmentally sound. They should encourage efficient use of fishing capacity.
- The IPOA should be implemented in a transparent manner, in accordance with Article 6.13 of the CCRF.

Urgent Actions: Four sections cover items that need immediate action.

Section I deals with assessment and monitoring of fishing capacity. States should support effort and research at national, regional and global levels to improve under-standing of this aspect. They should systematically identify fleets and fisheries that require urgent management. They should support the FAO in developing and maintaining compatible records of fishing vessels.

Section II deals with national plans of action for managing fisheries capacity. Plans should be developed, implemented and monitored, taking into account the effect of different resource management systems on fishing capacity. States should develop the means to monitor fishing capacity systematically and accurately, they should consider socio-economic requirements, including alternative sources of employment and livelihood for fishing communities. States should review implementation of national plans at least every four years. States should co-operate regionally or internationally in research, training and information to ensure management of fishing capacity.

Section III: States should consider taking part in international agreements on management of fishing capacity. These could relate for example to the Law of the Sea, overfishing of high seas stocks, data collection on catches in the high seas and in coastal areas, or dealing with problem States that do not fulfil their responsibilities under international law.

Section IV: This relates to immediate actions for major international fisheries requiring urgent measures – priority being given to those harvesting transboundary, straddling, highly migratory and high seas stocks that are significantly overfished.

States should act to reduce fleet capacity applied to these resources.

International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries:

Seabirds are being caught incidentally in various commercial longline fisheries (such as those for tuna, swordfish and billfish). Incidental catch of seabirds may impact negatively on fishing productivity and profitability. A number of commissions, as well as countries such as Australia, Japan, New Zealand and the U.S. have studied and adopted seabird mitigation measures. The International Plan of Action for reducing incidental catch of seabirds in longline fisheries (IPOA Seabirds) was developed in 1998 through a meeting in Tokyo (March 1998) and a meeting in Rome (October 1998). IPOA Seabirds urges assessment of the problem; mitigation measures; research and development; education, training and publicity; data collection programmes; and a variety of technical and operational measures.

International Plan of Action to stop illegal, unreported and unregulated fishing.

Illegal, unreported and unregulated fishing (IUU fishing) occurs in virtually all fisheries. It can cause an entire fishery to collapse. Examples of IUU fishing – violations of rules concerning fishing gear and fishing areas; misreporting or non-reporting of catches; reflagging of vessels (changing the flags of vessels to exploit countries that can't control fishing activity) What's the magnitude of IUU fishing? No one knows precisely, but it is believed that it accounts for a high percentage of total catches.

The IPOA-IUU was elaborated in draft at an expert consultation in Sydney in May 2000, adopted by consensus following further meetings at the 24th Session of COFI in March 2001, and endorsed by the FAO Council in Rome in June 2001.

The IPOA-IUU offers many tools for countries to combat IUU fishing – some designed for use by all, some to be used specifically by flag countries, coastal countries or port countries. It urges the adoption of national plans of action, co-operation between States, and research effort. It outlines internationally agreed market-related measures, and those to be carried out by regional organisations. The special requirements of developing countries are considered, reporting requirements are spelled out, the role of the FAO is explained.

BOBP-IGO to Organise National Workshop on the Code of Conduct for Responsible Fisheries (CCRF) in Sri Lanka

A two-day National Workshop on the Code of Conduct for Responsible Fisheries (CCRF) is being organised jointly by the Ministry of Fisheries and Aquatic Resources, Sri Lanka and the BOBP-IGO in Colombo on December 9 and 10, 2005.

More than 60 fisheries and aquaculture officials and NGO representatives will take part, representing organisations such as the Ceylon Fisheries Harbour Corporation, the Ceylon Fisheries Corporation, the Marine Pollution and Prevention Agency, the National Institute of Fisheries Nautical Engineering, the National Aquatic Resources Research & Development Agency and the National Aquaculture Development Authority.

Simply put, the CCRF is meant to ensure that everyone concerned with fisheries helps to develop and manage fisheries in a responsible way. In the long run, such responsible behaviour will mean more fish stocks, stronger food security, and better income-generating opportunities for all.

The Workshop will familiarise participants with the Code, its guidelines and instruments such as the International Plans of Action (see pages 33-34). It will discuss implementation of the Code in several areas: marine fisheries (coastal and deep sea), inland fisheries, aquaculture, post-harvest practices (infrastructure and quality control), trade and related matters (labelling/certification), information networking and dissemination, gender issues, safety-related programmes.

Similar National Workshops were held in India (29-30 September 2000), Bangladesh (23-24 April 2002) and Maldives (18-19 January 2004). They have been documented in BOBP/REP/90, BOBP/REP/93 and BOBP/REP/96. They enabled the preparation of action plans and road maps for implementing the Code in the three countries. A similar outcome is expected from the Colombo Workshop.

The BOBP has functioned as a catalyst, facilitator and coordinator for promoting and popularising the Code. Apart from organising national workshops, it has translated simplified versions of the Code into Bengali, Sinhala and Dhivehi, also into several Indian languages.

The Colombo Workshop has two distinctive features: it will discuss the impact of the tsunami on Sri Lanka's marine fisheries; and 2005 marks the completion of a decade of the CCRF.

"The fullest and most effective implementation of the Code can only be through a viable partnership between the government, industry and society," said a former Indian Secretary for Agriculture. This is also true of Sri Lanka.

What is the Code of Conduct for Responsible Fisheries?

The Code of Conduct for Responsible Fisheries was adopted on 31 October 1995 at the FAO Conference of that year by more than 170 countries. It took more than two years to elaborate. Experts from many countries and many fisheries disciplines worked long and hard to bring it about. It has been described as "one of the most important international instruments devised for management of our planet's aquatic resources".

The Code consists of a collection of principles, goals and elements of action. It sets out principles and standards of behaviour for responsible practices in fisheries. The Code is voluntary in nature, global in scope. It is directed at members and non-members of FAO, fishing entities, organisations of all kinds, fishers, people engaged in the processing and marketing of fish and fishery products – in short, everyone concerned with management and development of fisheries.

The Code reflects the spirit, substance and effort of a number of FAO and United Nations initiatives, conventions and conferences. The workshops being held by BOBP-IGO will further awareness and action on all these important global initiatives. The Code will also promote sustainable and responsible fisheries and help achieve the goals of national and global food security.

The Third International Fishing Industry Safety and Health Conference (IFISH 3)

The Third International Fishing Industry Safety and Health Conference (IFISH 3) will be held in Mahabalipuram (at the Temple Bay Resort) near Chennai, India, from February 1 to 4, 2006. Jointly organised by the BOBP-IGO, the FAO and the National Institute for Occupational Safety and Health or NIOSH, Alaska, USA, the Conference will bring together researchers and experts on both small-scale and commercial fisheries.

IFISH I was held in October 23 –25, 2000 in Woods Hole, Massachusetts, USA, where more than 100 fishermen and safety professionals from 13 countries gathered to discuss fishing vessel safety. **IFISH II** was held in Sitka, Alaska, September 22-24, 2003. This Conference was built upon the foundation of IFISH I and served to bring together colleagues interested in all aspects of fishing safety from around the world, in order to raise consciousness, build coalitions, disseminate information, and encourage action to prevent injury in the commercial fishing industry. **IFISH 3,** the third Conference in the series will build upon the earlier works of the two Conferences and place special emphasis on the issues confronting the small-scale fishermen.

The Conference will be followed by a 2-day Workshop (February 6-7, 2006) to review the long-term efforts by various agencies to rehabilitate communities affected by the December 2004 tsunami, and restore their productivity. The Workshop will also assess regional fishing and safety.

Some of the important topics to be discussed in the Conference include the following:

- Model programmes for fishing injury prevention, Health promotion and interventions.
- Strategies to improve safety – Innovative Approaches.
- Cost effective safety equipment relevant to small - scale fisheries sector.
- Relationship between fishery management and safety.
- Hazards associated with small fishing vessels and survival and rescue strategies for small-scale fishermen.
- Improving surveillance and understanding of fishing hazards.
- Community enterprise and participation.
- Community preparedness for disaster management.
- Strengthening technical and policy-related capacities of Government and non-government institutions related to small-scale fishing.
- Revival after Tsunami.

IFISH 3 should be of interest to professionals concerned with safety promotion, occupational health, injury prevention or public safety in small-scale or commercial fisheries. The stimulating programme will include keynote presentations, scientific papers and posters, a vendor display and social events.

For more information, visit the website www.ifish3.org or contact any of the following organisations:

1. Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO), Chennai, India. Yugraj.Yadava@bobpigo.org or Tabrez.Nasar@bobpigo.org
2. Food and Agriculture Organization of the United Nations. FAO, Rome, Italy. Jeremy.Turner@fao.org Ari.Gudmondsson@fao.org
3. National Institute for Occupational Safety and Health (NIOSH), Alaska Field Station, Anchorage, Alaska, USA. Dr George Conway goc1@cdc.gov

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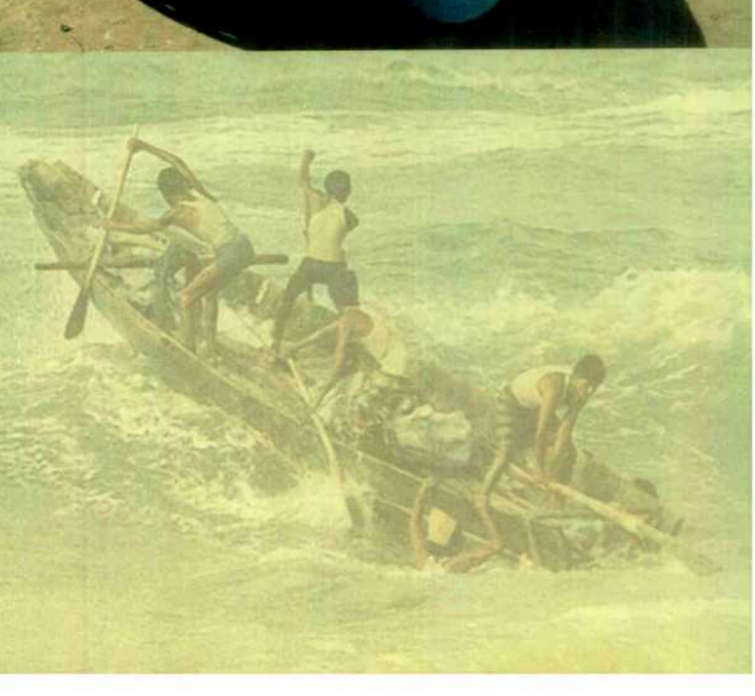
Sea safety for small-scale fishermen:

Moving from rhetoric to action

There has been more rhetoric than action on sea safety for small-scale fishermen. In this issue, we look back at the Chennai Declaration adopted four years ago. What's the progress on implementing its recommendations? It's time to move from rhetoric to action.



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Sea safety for small-scale fishermen: Moving from rhetoric to action

From February 1 to 7, some 70 experts from many countries will meet in Mahabalipuram for IFISH-3, the Third International Fishing Industry Safety and Health Conference. It is being organised jointly by the BOBP-IGO, the FAO of the United Nations and the Alaska Field Station of the National Institute for Occupational Safety and Health, USA.

This is the first time IFISH is being held outside the U.S. Appropriately enough, the conference will place a special emphasis on the safety and health of small-scale fishermen.

This issue therefore focuses on sea safety issues. Pages 6 to 11 summarise the report of Mr Agnar Erlingsson, consultant who visited four countries of the region and did a comprehensive survey of sea safety for small-scale fishermen.

It is therefore pertinent to recall the efforts of the BOBP and the IGO in this area. Four years ago, the Chennai Declaration on sea safety for artisanal and small-scale fishermen was adopted at a regional workshop in Chennai (See box). Leading representatives from the seven member-countries of BOBP at that time (Bangladesh, India, Indonesia, Maldives, Malaysia, Sri Lanka, Thailand) attended.

Let us re-visit the Chennai Declaration, study its recommendations and the action taken since by governments, fishermen, NGOs and others.

Integration of safety issues into member-countries' fisheries policy and holistic fisheries management frameworks: As Mr Agnar Erlingsson puts it, "While some efforts are being made at provincial and national levels to improve the safety of small-scale fishermen, they are not commensurate with the magnitude of the problem."

Life jackets have been distributed to fishermen, subsidies have been given for the Global Positioning System (GPS). In India, a comprehensive marine policy says that sea safety issues ought to be addressed, but it contains no specifics.

In small-scale fisheries, the concept of co-management is coming into focus. The success of community-based fisheries management (CBFM) has been demonstrated successfully in the past. (The BOBP-supported extension services project in Ranong Province, Thailand, is an example. However, this project had no sea safety component.) Wherever CBFM is strong, it would provide an entry point for sea safety.

Legislation, regulation and enforcement at the national level: The remarks of consultant Agnar Erlingsson (pages 6-10) are pertinent.

To take his comments on Tamil Nadu, there are no regulations for design and construction of fishing boats. Fibre-reinforced plastic (FRP) boats are of poor quality. Enforcement of rules for safety equipment is lacking. He recommends a process of certification of boatyards manufacturing FRP boats, training of boat surveyors, encouraging registration by linking it to subsidies, updating of safety regulations and marine accident statistics.

Most small-scale fishing boats in this region are not insured. There's unfortunately no mechanism to make insurance compulsory. Whenever a calamity occurs, the entire cost of boat restoration and rehabilitation has to be borne by the government. A car cannot take the road without insurance; a similar rule should apply to fishing vessels in the sea.

Incorporation of FAO/IMO/ILO voluntary guidelines for the design, construction and equipment of small fishing vessels: There's not much evidence of this happening.

Fisheries and maritime administrations should enhance their knowledge of the operations and constraints of artisanal and small-scale fisheries sectors …. Unlike commercial fishing and registered vessels, small-scale fishing boats are so numerous and so varied in size, capacity, engine power and operational range, that it's an enormously challenging task for any government to set norms or certify safety. The government should organise studies and programs that systematically set out the status of fishing boats.

Strategies to involve the participation of fisher communities: Sea safety campaigns may flop unless the fishing community is fully involved in the exercise. It's a question of attitude. The fisher should be aware of the dangers he faces and co-operate with efforts to reduce the danger. Fisheries departments need to work with fisheries co-operative societies and fisheries associations to spread the message of safety.

Financial and other incentives to encourage the wide use of safety equipment: These should be linked to registration of boats and compliance with safety and training regulations, as consultant Erlingsson points out.

The following extracts from an FAO report on sea safety are enlightening:

"Some of the factors which have made fishing the most dangerous

Excerpts from Chennai Declaration

1. Sea safety issues should be comprehensively integrated into member countries' fishery policy and management frameworks.
2. Legislation, regulation and enforcement at the national level.
3. Measures for a harmonized and holistic fisheries management framework for the Bay of Bengal.
4. Incorporation of the FAO/IMO/ILO voluntary guidelines for the design, construction and equipment of small fishing vessels and the FAO/IMO/ILO document for guidance on the training and certification of fishing vessel personnel into regulatory frameworks, as appropriate.
5. Fisheries and maritime administrations should enhance their knowledge of the operations and constraints of the artisanal and small-scale fisheries sectors in order to formulate effective guidelines, standards and regulations for the safety of fishing vessels, including certification and training of crews.
6. Development and implementation of education, training and awareness programmes which satisfy regulatory requirements, while also building a culture of sea safety within artisanal and small-scale fishing communities.
7. Strategies that involve the participation of fisher communities, families, the media and other stakeholders to promote adoption of a wide range of safety measures.
8. Measures to enhance the economic viability of artisanal and small-scale fishing enterprises as an essential element of sea safety.
9. Financial and other incentives to encourage the wide use of safety equipment, and training in the use of such equipment.
10. R & D for cost-effective safety-related equipment relevant to the needs of artisanal and small-scale fisheries.
11. Formulate a regional sea safety programme.
12. Address the issue of sea safety on an urgent basis.

occupation in the world are: excessive fishing effort; increased competition; reduced profitability; economies in vessel maintenance, equipment and manpower; fatigue; recklessness; fisheries management measures (which do not take sufficient account of the human element or fishers' safety into consideration); diversified fishing operations unaccompanied by training, traditional experience and skills.

In developing countries, the consequences of loss of life can be devastating: widows have a low social standing, there is no welfare state to support the family and with lack of alternative sources of income, the widow and children may face destitution.

Effective approaches to safety at sea everywhere in the world and at all levels, rely on three lines of defense:

- prevention (the most reliable and cost-effective component): suitable equipment, training, experience, information and judgement to avoid getting into trouble in the first place;
- survival and self-rescue: the equipment, training and attitudes necessary to survive and effect self-rescue when things start to go wrong;
- Search and Rescue (the most costly and least reliable of the three levels): systems of alert, search and rescue, which are called upon when the first two lines of defense have failed.

There are a number of areas where improvements can be made at the national level with FAO assistance:

- provision and analysis of data identifying the cause of accidents;
- education and training of trainers, extensionists, fishermen and inspectors;
- improved fisheries management, safety regulation and enforcement;
- increased collaboration between fishermen, fishers' organizations and government."

From Alaska to Mahabalipuram

Dr George A Conway, Chief of the Alaska Field Station of the National Institute for Occupational Safety and Health (NIOSH) is one of the drivers of IFISH-3. He was also a key figure of IFISH 1 (held in Woods Hole, Massachusetts, USA in 2000), and IFISH 2 (held in Alaska in 2003). Excerpts from his conversation with ***Bay of Bengal News.***

How his work with sea safety started: "We have been working on sea safety issues from 1991, because Alaska had the highest number of fatalities in the fishing industry in the U.S. (some 35 deaths a year). We were asked to set up surveillance, prevention, and safety activities.

We provided technical assistance to the Coast Guard, and collaborated with the Alaska Marine Safety Education Association and the North Pacific Vessel Owners' Association. There were regulations implemented for cold water fisheries in the U.S. under the Commercial Fishing Vessel Sea Safety Act of 1988. That law required such devices as life rafts, personal floatation devices, EPIRBS (Emergency Position Indicating Radio Beacons) which are satellite-based communication devices.

The combined effect of all this: the mortality in Alaska fell dramatically, by more than 70%. It now stands at 10 to 12 deaths per year.

How did IFISH come about? We held three domestic conferences in the U.S. in 1992, 1995 and 1997. The last one, held in Seattle, suggested that we expand the scope of the conference. Result: IFISH 1 in 2000. There were some 135 participants including FAO and ILO, from 17 countries. IFISH-2 had some 125 participants from 20 countries. The FAO sponsored participation by eight developing countries.

The view was expressed that the next IFISH conference should be held in a developing country, and should emphasise sea safety in small-scale and artisanal fisheries. Dr Y S Yadava volunteered to host IFISH-3 on behalf of BOBP-IGO, and that's how the conference has moved here. Further, this was a logical sequel to the Chennai Declaration adopted in October 2001.

Any conclusions from IFISH-3 are not mandatory, but we believe that the process of information, discussion and exchange of views among a variety of fisheries experts from different parts of the world about safety issues, takes both knowledge and constructive action forward. We are very optimistic about the potential of IFISH-3.

The Chennai Declaration recommended the formulation and implementation of a regional sea safety programme, employing a consultative and participatory approach, building upon institutionally derived data, together with the operational experience of artisanal and small-scale fisher communities. It also recommended that the issue of sea safety be addressed on an urgent basis. However, little has been achieved so far and it is therefore time to address the multi-dimensional issues of sea safety on priority basis so that the rhetoric is turned into reality.

– Y S Yadava

Coping with 12/26: They Will Overcome

"It was so brutal, so quick, so extensive, that we are still struggling to fully comprehend it," said UN Secretary-General Kofi Annan.

Fishers and fisher communities were bewildered, disoriented. The sea was their mother, their protector. How could she do this? The tsunami of 26 December 2004 that struck 12 countries in the Indian Ocean area was more than a killer (at least 220 000 people) and destroyer (property worth several billion dollars). It deprived fishers of their families and livelihoods and shattered their confidence.

"Depression loses its power when fresh vision pierces the darkness," said Peter Sinclair. A tsunami of relief overwhelmed fisher communities, reflecting the richness and nobility of the human spirit.

Their terrible tragedy has given fishers and governments an opportunity to recreate a new world from the ruins of the old. "Build back better" is the motto of reconstruction.

This is what sustains fishers and fisher communities, a tribe whose everyday life is full of adventure. On the first anniversary of the tsunami, they recalled the event with prayers, flowers, candle-light ceremonies and sirens. They look to the future with trepidation — and hope. Encouraged by the dedication and compassion that governments, individuals and institutions have shown.

They will overcome.

Safety of small fishing vessels in India, Maldives, Sri Lanka and Thailand

In October 2005, an FAO consultant, Agnar Erlingsson, carried out a survey and a detailed assessment of the safety of small fishing vessels in India, Maldives, Sri Lanka and Thailand on behalf of the FAO of the United Nations and the BOBP-IGO. A valuable 52-page report resulting from his study will be discussed at the IFISH-3 Conference, to be held from February 1 to 7, 2006 at Mahabalipuram (Chennai). Here are glimpses into what Mr Erlingsson saw and what he said.

Mr Agnar Erlingsson's first-of-its-kind study on the safety of small fishing vessels (below 24m in length) in Tamil Nadu (India), Maldives, Sri Lanka and Thailand was carried out in October 2005. The study was an initiative of the Fisheries Industries Division of FAO, Rome, and the BOBP-IGO. It focused on "the extent and effects of all the mandatory requirements that existed for fishing vessels under 24m in length," and "how and why they are not effective".

In the course of the study, the consultant met transport and fisheries officials, interviewed the Coast Guard or those responsible for Safety and Rescue (SAR), visited fishing ports and met their administrators, surveyed fishing boats of all categories, a few in some detail; surveyed local boatyards and their production status and interviewed their managers.

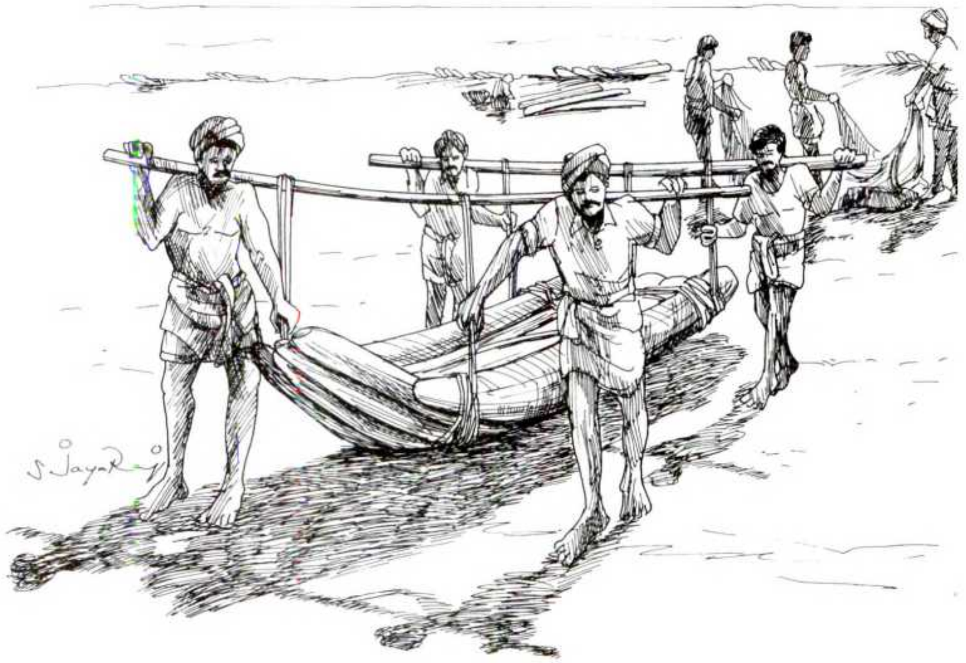
The study has led to a comprehensive report. It will also serve as a discussion paper for the Third International Fishing Industry Safety and Health Conference or IFISH-3 to be organised in Mahabalipuram (Chennai) from February 1 through 7, 2006, by the BOBP-IGO in co-operation with the FAO and the Alaska Center of the National Institute for Occupational Safety and Health (NIOSH), USA.

For each country, the report describes the current status of fishing vessels and of boatbuilding capacity, discusses registration procedures and regulations for vessels, and various aspects concerning safety. It concludes with a number of recommendations for the future. It also contains a "global perspective" and "issues for discussion".

General comments on safety: Mr Erlingsson says that safety aspects of a craft relate to the vessel itself and to ancillary safety equipment on board. "The best safety equipment is the boat itself". Safety features of boats relate to boat design, construction, watertight integrity, stability and machinery.

The boats: In Tamil Nadu, India, boats under 24m may be divided into three groups – some 35 000 kattumarams, lografts about 4.5 to 8m in length; some 8 000 vallams, previously made of wood, nowadays from FRP (fibre-reinforced plastic) generally 8 to 9m long; some 12 000 mechanised craft, between 11 and 15m long, decked vessels of wood, typically with a main diesel engine of 70 to 120 H.P.

Fishing vessels in the Maldives may be divided into three categories: the Bokkura, used for coastal reef fishing, a double-ended wooden rowing boat 7 to 15 feet in length; the Vadhu Dhoni, a wooden sailing



The kattumaram of Tamil Nadu, India, is an excellent craft for small-scale fishermen, but has safety limitations.

boat 15 to 18 feet long, traditionally used in line trolling for tuna; and the Mas Dhoni, which fish for tuna by the pole and line method, and range in size from 50 feet to 110 feet in length, mechanized with engines from 80 H.P. to 500 H.P.

Sri Lanka's fishing craft are of four types: some 15 000 traditional dugout orus with outriggers; about 12 000 open boats with outboard motors; and some 3 000 mechanised boats of which some, fitted with 15-25 H.P. inboard engines, go out fishing for a few days a week; and larger boats, fitted with 30-80 H.P. inboard diesel engines that do fishing trips of 30 to 45 days.

Thailand has some 2 800 traditional craft without engines; some 36 000 longtail boats, usually 5 to 8m long, with outboard motors; and about 15 000 mechanized boats, most of them between 15 and 25m long, with inboard engines. These are 1995 census figures, 11 years old. Most Thai fishing vessels are built of wood. There are very few FRP boats. But new boat hulls are usually of steel.

Main Findings

Mr Erlingsson's report has a two-page summary of "main findings" with a tabular statement of "issues and recommendations" for each country; plus observations and findings separately for each country in the main text.

"The main finding of this study is that in general, the safety of these small fishing vessels is not under control," says Mr Erlingsson. "Regulations for registration may exist but enforcement is very much at random. Regulations for design, construction, safety equipment and crew qualifications are in most cases non-existent — though those responsible may have authority to set rules and enforce them. A notable exception to this is in the Maldives, where regulations for safety equipment are in place, although enforcement may be somewhat lacking. In another country, Thailand, there is usually some safety equipment available on board the fishing boats although there are no regulations to this effect."

Serious accidents to fishing vessels in the Maldives are rare, but awareness of safety regulations should improve.

Mr Erlingsson says that to ensure some control over the safety of fishing vessels, it is necessary that they be registered, at least those that are mechanically powered. Both governments and fishermen ought to be committed to this. Fishermen can be motivated by certification, award of fishing licences or subsidies — on fuel oil for example. Governments should bear in mind that search and rescue (SAR) is very costly, and registration is far cheaper.

Discussion on Tamil Nadu

Mr Erlingsson says that from the safety standpoint, fishing vessels in Tamil Nadu should focus on four main areas: registration, training, minimum practical safety equipment on board, certification of FRP boatbuilding.

"It boils down to changes in attitude and motivation on the part of fishermen as well as the government, and processes in place."

Fishing vessels must be registered for any regulatory enforcement to be effective. "Present rules require all fishing boats that fish for profit to be registered, but the rules are apparently not being followed because there is no motivation for it," says Mr Erlingsson. He therefore recommends that such registration be tied up with the discount or subsidy fishermen are already getting on diesel oil. "Other ideas and methods will definitely develop as this system drops into place."

Training/Education should cover navigation, safety, first aid and minor engine repairs. Regulations do exist concerning minimum training and the qualifications of the skipper and the engine driver, but they are not enforced. These qualifications should be checked when the safety equipment of boats is surveyed.

On ***minimum practical safety equipment on board,*** Mr Erlingsson says that some rules that exist do not seem to be very effective. He has suggested a revised list of equipment.

Safety of Small Fishing Vessels: Issues and Recommendations by Country

Country	*Issues*	*Recommendations*
Tamil Nadu, India	Registration of boats is required. However, follow up is not clear. Enforcement of rules for safety equipment is seriously lacking. Control of qualifications and training of crew is deficient. No rules for design and construction. FRP boat building of poor quality. Marine accident statistics lacking.	Registration is imperative for safety; this may be done through subsidy motivation. Training of surveyors is necessary. Rules for for safety equipment may be enforced by linking diesel oil subsidy with compliance. Safety regulations to be updated. FRP boatyards to be certified. Statistics on accidents need to be improved.
Maldives	Registration pretty well in place. Vessels generally well-built, but construction rules not in place. Fairly adequate safety equipment rules, but compliance is unsatisfactory. So are qualifications standards of crew. FRP boats are generally good in quality. Boatyards maintain high standards, but lack standardization and certification. No statistics available on marine accidents.	Present status good, but can be made better. Training of surveyors and enforcement of rules to be improved. Qualifications of crew to be enhanced. Safety equipment quality to be improved. FRP boatyards to be certified. Accident statistics to be made available.
Sri Lanka	Regulations for registration are in place but enforcement is lacking. No regulations exist for construction, design or safety equipment, but rule-making authority exists. Only informal rules for boatbuilding – these do not seem to be working. Training and qualifications of crew not standardized, and are deficient. FRP boatyards of doubtful quality. No coastguard or SAR vessels. Statistics good but no record of accidents.	Better follow-up of registration needed. Regulations for design, construction and safety equipment to be put in place. FRP boatyards to be certified, boats to be inspected on completion. Surveyors of boats to be trained. Training and qualifications of crew to be given all due consideration. SAR boats to be made available. Statistics should include record of accidents at sea.
Thailand	Registration procedures random, not systematic. No regulations for construction, design or safety equipment in place. Crew qualifications inadequate. Use of safety equipment random. Thai Navy effectively controls SAR. No statistics on marine accidents.	Follow-up in all categories to be improved. This is to be done by applying fish licence motivation. Surveyors to be employed and trained for enforcement both in boatbuilding and for ships in service. Statistics on accidents at sea should be improved.

Enforcement of rules for safety equipment is often lacking in small-scale fisheries.

For non-mechanized kattumarams and similar boats: No particular rules apart from oars and paddle if that is considered sensible.

For motorized and mechanized boats of up to 9 m length: An electric torch (watertight), tools to repair motors, oars/paddle, a small buoyancy float to be marked with name /registration number of the vessel, a bucket or a bailer.

For mechanized vessels of 9 m in length and more: a compass, navigational lights in accordance with Colregs, bilge pumps, both manual and mechanically driven, anchor with rope, paddle/oars, bucket and bailer, buoyancy floats for all on board, marked with name/ registration number of vessel, first aid box, VHF communication, tool kit and spares for engine, including one or more watertight battery torches.

For vessels of more than 15 m length: In addition to the above, GPS and EPIRB, when an inexpensive type comes on the market.

Mr Erlingsson says that the quality of local production of FRP 27-30 foot vallams – in the matter of facilities, environment, materials, scantlings, methods and training – needs to be improved. Experienced master builders or organisations should be sought to set quality standards, provide training and qualify the yards for certification given by a local statutory body. "This way the customer would know what product he is getting and a certain degree of safety and durability would be assured."

Discussion on the Maldives:

Extracts from conclusions and recommendations:

- Registration of fishing vessels in Maldives is pretty well in place. All the vessels surveyed appeared to be well built and in fairly good condition.
- Serious accidents on fishing vessels are rare, mostly due to engine breakdowns. No one interviewed could recall a recent fatal incident on a Maldives fishing boat.
- Many interviewed said that awareness of safety regulations was generally lacking amongst fishermen.
- There are no rules for the making of FRP boats. Since these are taking over from wooden boats, some sort of control should be imposed on boat-builders and their methods.
- Some design features should be improved; this applies specifically to the height of coamings of engine room openings, hatches and hatch cover closures. Stability should receive some attention in larger vessels.
- Regulations for safety equipment seem to be appropriate. But it's questionable whether all the rules should apply for the smallest boats.

There do not appear to be serious problems concerning the safety of small fishing vessels in Maldives and their fishermen. A few recommendations:

Training: Fishermen´s awareness of safety issues may be improved by training. Presently, all engine drivers take part in a course concerning navigation and engine use; first aid and safety should be included as a part of this course.

Quality of safety equipment: Life vests are required on all boats for all persons aboard. The quality of these is not defined; they are stored in various places. It is important that a minimum quality for life vests and

Fishing vessels at the harbour in Tuticorin, Tamil Nadu.

their storage facilities be described. The Ministry of Transport should propose a definition with respect to material, operational buoyancy, support angle and marking.

Safety equipment on small boats: Small boats may not always have proper storage facilities for prescribed safety equipment. Life vest requirements for at least two people on all such boats would mean adequate storage on those boats. Alternatively, life floats could be considered.

Certification of FRP boat yards: Some sort of a certification system could be developed in Maldives for boatyards so that customers know what kind of a contract they are entering into and what product they will be getting. This certification need not necessarily be of an international standard, assistance might be sought from FAO or some other organisation capable of providing such help.

Discussion on Sri Lanka:

Here are extracts from conclusions/ recommendations:

Registration: Registration of fishing vessels is in place, better follow-up is wanted. Fishing licenses or permits should be issued only to registered boats.

Regulations: Regulations should be formulated for construction, navigation, safety and manning standards. Requirements should be laid down about the training and qualifications of vessel operators.

Boatbuilding: Most boats, traditional or modern, are built in FRP by the country's 75 boatyards. None of these yards are certified; most employ workers with little or no formal training. Boatbuilding standards in accordance with internationally accepted levels and practices should be enforced. This is already being done by a handful of boatyards. They should be given a certificate or a letter of approval. Only certified yards should be given licenses.

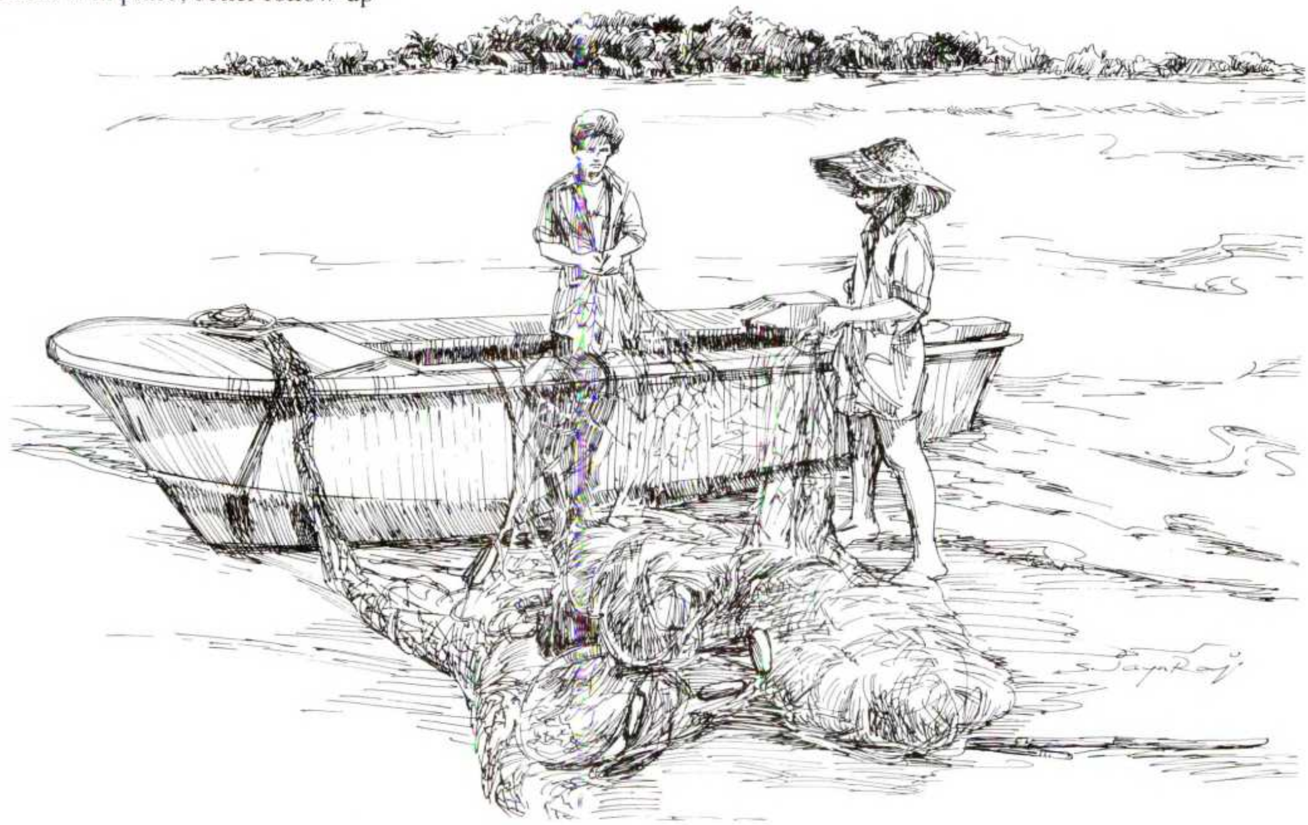
Safety and Rescue: Though this report is about safety, the dearth of rescue vessels should be mentioned. They are sorely needed and should be supplied as soon as possible. The round-the-clock monitoring and surveillance system and the coastal network of radio stations is worthy of praise, and should be strengthened and modernized.

Discussion on Thailand

Here are extracts from conclusions/ recommendations:

Registration: All motor-driven boats in Thailand should be registered with the Marine Office. Proper registration and a valid certificate should be a prerequisite for a fishing license, otherwise safety regulations may be difficult to enforce.

Regulations: For all decked and mechanized fishing vessels, regulations will have to be put in place; this should be the responsibility of the Marine Office. The design, safety and qualification regulations should cover watertight integrity, vessel stability, safety equipment, navigation and communication equipment, training, and the qualifications of the skipper and engine driver. For longtail boats, only minimum requirements regarding life saving, navigation and communication equipment are



Regulations need to be formulated on construction, navigation and safety standards of fishing boats in Sri Lanka.

considered necessary. These may be administered by the Department of Fisheries if, and as, found practical.

Boatbuilding: At present the main building activity relates to the smaller, open, longtail boats and the larger steel fishing vessels. A long and successful tradition with longtail boats and an accident-free performance seems to indicate that no immediate improvement is necessary. As regards the larger mechanized steel vessels, it is imperative, to ensure both quality and safety, that they are approved and authorized before they are in business.

No FRP boatbuilding activity was seen. But it is very probable that, production of FRP boats is going on somewhere around the coast. The Marine Office should therefore be ready for such a development and formulate rules and regulations for the production of FRP boats.

Training: Skippers and engine drivers of decked mechanized boats should undergo some training in emergency procedures, elementary stability, navigation, communication, first-aid and engine repairs. With time, other crew member will also follow suit.

Global perspective:

The consultant says that safety-at-sea problems for fishermen differ in developed and developing countries. In the latter, political commitment to invest in the safety of fishermen in small-scale and artisanal fisheries seems to be lacking. This attitude must change.

It is true that there are no international rules or regulations for fishing vessels smaller than 12m in length. But the Nordic Rules for Construction and Certification of Vessels Less than 15m in length, were formed by a working group from Nordic countries in the early 1980s. They applied to recreational craft and working boats constructed of wood, steel, aluminium, ferrocement and FRP. These standards have been used to good effect.

Boatyards and landing centres in Sri Lanka (top and centre) and Thailand (below) are sometimes deficient in trained manpower and adherence to safety regulations.

Regional Training Course on Code of Conduct for Responsible Fisheries

The first Regional Training Course on the Code of Conduct for Responsible Fisheries (CCRF) will be held in Chennai during September-October 2006. It will be organised by the BOBP-IGO.

Background

The Committee on Fisheries (COFI) at its 19th Session in March 1991 made an appeal for responsible, sustained fisheries. Subsequently, the International Conference on Responsible Fishing, held in 1992 in Cancûn (Mexico), requested the FAO to prepare an international Code of Conduct to address the issue.

On October 31, 1995, more than 170 members of the FAO unanimously adopted the Code. It has been described as "one of the most important international instruments devised for management of our planet's aquatic resources."

Simply put, the Code consists of a collection of principles, goals and elements of action. It sets out principles and standards of behaviour for responsible practices in fisheries. The aim is to ensure effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity.

The Code is voluntary in nature. It is directed at members and non-members of the FAO, fishing entities, organisations of all kinds, fishers, people engaged in the processing and marketing of fish and fishery products – in short at everyone concerned with development and management of fisheries.

To support implementation of the Code, the FAO has brought out a series of 12 booklets known as "FAO Technical Guidelines for Responsible Fisheries". The booklets relate to fishing operations, the precautionary approach to capture fisheries, integration of fisheries into coastal area management, fisheries management, aquaculture development, inland fisheries, responsible fish utilization, indicators for sustainable development of marine capture fisheries, and implementation of the International Plans of Action to prevent illegal, unreported and unregulated fishing; conservation and management of sharks, management of fishing capacity; and reducing incidental catch of seabirds in longline fisheries.

Why is a course on CCRF needed?

Though the CCRF is more than 10 years old, understanding of it at the grassroots level is poor, awareness of its provisions at all levels is inadequate. Better understanding of the CCRF is essential for tackling the many problems that confront fisheries today – over-exploitation, pollution, etc.

The course can create a cadre of trained scientists and officials who are aware of the Code and its technical guidelines. These persons will constitute a resource pool to facilitate implementation of the Code in the region.

The course should ultimately influence community participation and grassroots action in promoting fisheries development and management. The Code will have a meaning only if fishers and fisher communities apply it from day to day, and fisheries officials and extensionists promote the Code in a pro-active manner. The ultimate triumph of CCRF also lies in its localization, and that's what the course is designed to bring about.

Course participants will be made conversant with the Technical Guidelines and the International Plans of Action. They will develop new capacities for planning, managing and evaluating fisheries programmes from the standpoint of effective implementation of the CCRF. Field-based experiences drawn from fisheries development programs will be included in the course.

Participants

Course participants will be from Government agencies, NGOs and research organisations interested in effective implementation of the Code. They could be fisheries extension workers, mid-level government officials, research scientists, donor agency representatives.

Duration

Fifteen days, including three to four days of field trips.

Expected outcomes

At the end of the course, the participants will have:

1. discussed and understood the Code and the technical guidelines better.
2. identified the advantages and constraints of various methods of the implementation of the Code through the analysis of case studies and field experiences; and
3. prepared an action plan to incorporate design, implementation and evaluation elements of CCRF implementation strategy into ongoing or planned activities, projects and programmes.

Contact: Director, BOBP-IGO at info@bobpigo.org *or* Yugraj.Yadava@bobpigo.org for further details and for booking a slot in the course.

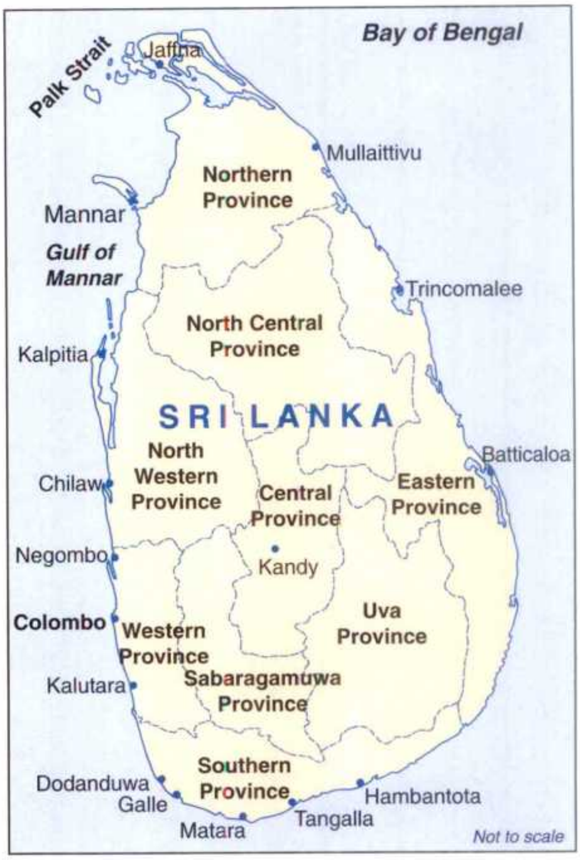
Sri Lankan Fishers and Fisheries Today

Photographs: S Jayaraj

Fisheries is one of the drivers of the Sri Lankan economy (fish provides food and nutrition, jobs and incomes, foreign exchange earnings, tourism revenues). Sri Lankans love their fish. Fisheries images catch your eye in tourist brochures (the beautiful Oru, smiling fishermen, stilt fishermen on the coast, St John's market in Colombo, catches in Negombo), they have also adorned the pages of ***Bay of Bengal News*** many times during the past 26 years.

A few facts**:** coastal, offshore and inland fisheries together employ 250 000 active fishers, a population of over a million. Some 285 000 tonnes of marine fish is landed annually, of which 90 percent is consumed locally and 10 percent exported. But Sri Lanka imports an additional 70 000 tons of dried and canned fish annually to meet local demand. Some 610 species of coastal fish, 90 species of oceanic pelagic species, 60 species of sharks and 215 demersal species have been reported in Sri Lanka. For the domestic market, the high-value species are Spanish mackerel, horse mackerel, trevally, tunas and tuna-like species. There is a heavy consumption of shark and of small pelagics such as sardines, herrings, anchovies and Indian mackerel. Prawns, *beche de mer* and shark are important species for export.

There are 12 fishery harbours, several large and small anchorages and as many as 700 village-level landing sites. The total fishing fleet in 2004 consisted of more than 31600 boats – traditional craft (motorized and non-motorized), 6-7m FRP boats, 3 1/2 ton boats, offshore multi-day boats and beach seine craft. Traditional fishing craft (simple canoes with outriggers) make up nearly half


Palk Strait
Jaffna
Bay of Bengal
Mullaittivu
Northern Province
Mannar
Gulf of Mannar
Trincomalee
North Central Province
Kalpitiya
SRI LANKA
North Western Province
Batticaloa
Chilaw
Central Province
Eastern Province
Negombo
Kandy
Colombo
Western Province
Uva Province
Kalutara
Sabaragamuwa Province
Southern Province
Dodanduwa
Galle
Matara
Tangalla
Hambantota
Not to scale

the fleet, in spite of all the development during the past few years. Government schemes for fishermen include low-cost housing, community centres for fishing villages, drinking water supply, bus services to transport fishermen and gear, an accident compensation scheme and a variety of other smaller schemes.

A narrow continental shelf is a major resource-limiting factor in Sri Lanka. Some issues: heavy exploitation of pelagic species and inadequate exploitation of demersal and other species (commercially valuable fish in deeper waters, such as large yellow fin and big eye tuna remain under-exploited); lack of protected landing facilities in some areas; unsatisfactory catch monitoring system and inadequate knowledge of fishery resources. The multi-gear multi-species coastal fisheries — and the use of environmentally harmful fishing gear by groups of fishermen – have triggered many user conflicts between different groups. The offshore fishery is characterized by its heavy reliance on gillnetting and associated post-harvest losses.

"Inadequate fisheries management overrides many of these issues," says Mr G Piyasena, Director-General, Department of Fisheries and Aquatic Resoruces. With inadequate numbers in personnel and facilities, Sri Lanka's MCS (monitoring, control and surveillance) capability is unsatisfactory. So is fishermen's compliance with management initiatives introduced by the authorities — such as boat registration and licensing.

The December 2004 tsunami was a huge catastrophe. It killed more than 35 000 people in Sri Lanka from coastal communities, affected nearly 80 per cent of active fishers and destroyed or damaged more than 75 per cent of the fishing fleet. A large number of small-scale fishing craft

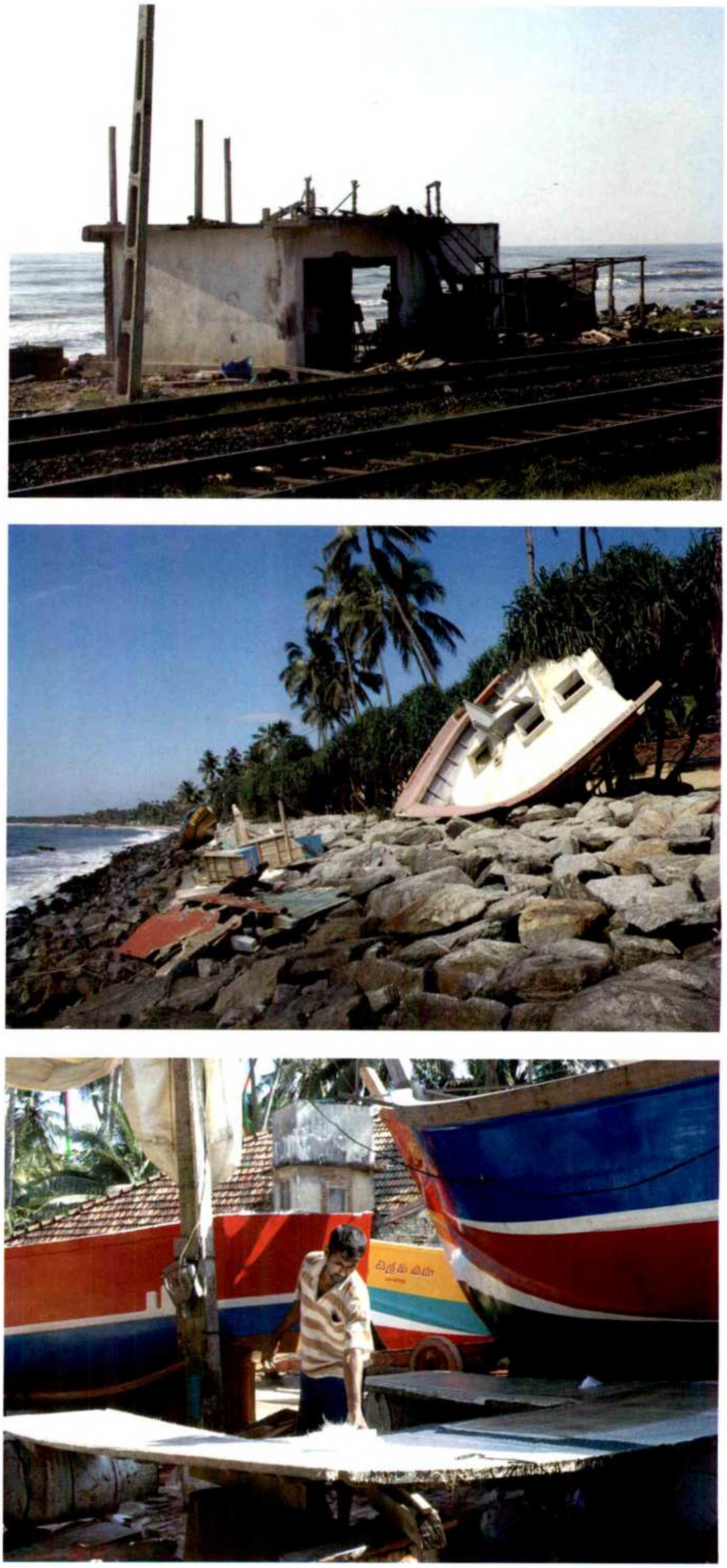
Right and facing page: Shots before and after fish landing in and around the Beruwala harbour.

and fishing gear were destroyed. Of the 12 fishing habours, 10 were severely damaged. Public and private utilities such as ice plants, landing ports, markets, and houses of the fishing community were destroyed. Production during Jan-August 2005 was less than 40 percent that during the corresponding period in 2003 and 2004.

But post-tsunami rehabilitation allows opportunities to build back better. Some key areas identified in the post-tsunami reconstruction and development strategy: Improved designs for offshore multi-day boats; technological improvements with onboard fish handling and preservation to minimize economic waste and improve quality of fish landed; strengthening of participatory fisheries management, particularly in coastal fisheries. through better awareness creation and better facilities for resource assessments, boat registration and licensing systems.

"Attitudinal changes are required right across the board to tap the opportunities of post-tsunami reconstruction and meet the challenge of building back better," says Mr Piyasena.

The BOBP has since 1979 been an active partner of Sri Lanka in marine fisheries development and management. Several ideas and innovations have been introduced, and numerous lessons learned, in the areas of fisheries management, fisheries resources including ornamental fisheries, fishing craft, fishing gear, aquaculture, women's empowerment, information dissemination (including radio programmes for fisherfolk). Several score seminars, workshops and training courses have helped strengthen know-how and facilitated flow and exchange of ideas. Two of the most recent activities initiated by the BOBP-IGO (workshop on the Code of Conduct for Responsible Fisheries, and an art contest on the tsunami among schoolchildren) have been reported elsewhere in the issue.



Top and centre: Typical examples of tsunami damage - a fisher's home and a fishing boat. Bottom: Boats being repaired and restored at a boat building yard.

BOBP-IGO's Governing Council Meets in Colombo

The Governing Council of the BOBP-IGO, which met in Colombo on 12 and 13 December 2005, laid the ground map for the IGO's work next year, endorsed work done the previous year, and discussed and approved the report of the IGO's Technical Advisory Committee.

Representatives of the IGO's four member-countries (Bangladesh, India, Maldives and Sri Lanka) took part at the Governing Council meeting, besides observers from the FAO, INFOFISH, NACA (Network of Aquaculture Centres in Asia and the Pacific) and SACEP (South Asia Co-operative Environment Programme.)

Mr E Jinadasa, Secretary, Ministry of Fisheries and Aquatic Resources, Sri Lanka, chaired the inaugural session. In the second session, Mr G Piyasena, Director-General, Department of Fisheries and Aquatic Resources, Sri Lanka, was unanimously elected the new chairperson of the Governing Council.

The participants were welcomed by Mr Jinadasa, Mr A Hettiarachchi (Director-General, Ministry of Fisheries and Aquatic Resources, Sri Lanka), Mr Ajay Bhattacharya (outgoing chairman of the Governing Council and Joint Secretary, Fisheries, Ministry of Agriculture, Government of India) and Dr Y S Yadava (Director of the BOBP-IGO).

Dr Yadava pointed out that three years earlier, plenipotentiaries from the erstwhile BOBP had met at the same venue to finalise the setting up of the IGO.

Second Meeting of the
Governing Council
- 13 December 2005, Colombo, Sri Lanka

Delegates at the Governing Council Meeting.

Mr Jinadasa described the BOBP-IGO as an infant among sub-regional and inter-governmental groups. It was a matter of pride that within a brief period the IGO had planned numerous programmes – such as safety at sea of small-scale fishermen, resource assessment, capacity-building, information networking, and popularization of the Code of Conduct for Responsible Fisheries. He said member-countries had the "will and capacity" to work closely with the BOBP-IGO. He hoped its membership would expand. He thanked the secretariat of the IGO for organizing two activities in Sri Lanka along with the Governing Council meeting – an art contest for school children and a workshop on the Code of Conduct for Responsible Fisheries.

The BOBP-IGO's activity priorities for 2006 as agreed on at the meeting:

- Capacity-Building and Information Services for Fisheries Development and Management in the Bay of Bengal Region.
- Translation and printing of the FAO CCRF Technical Guidelines on Marine Fisheries and their supplements in the national languages of member-countries.
- Adaptation of the Code of Conduct for Responsible Fisheries to meet regional requirements.
- Third International Conference on Fishing Safety and Health and the Regional Workshop on Review of Post-Tsunami Fishing and Safety Assessment at Chennai, Tamil Nadu, India, 1- 7 February 2006.
- Setting of a Regional Information Network to provide appropriate information for development, planning, research and training. This will assist member-countries in strengthening their national capabilities in development and management of coastal fisheries.
- Organisation of a Fishermen's Week to promote and institutionalise a participatory and community-based system of management of fisheries and aquatic resources.
- Information dissemination through the ***Bay of Bengal News*** and other publications and the BOBP-IGO's website to inform, enthuse and bind governments and other fisheries stakeholders of the region.

(II) Women in Fisheries:

- Review of the Status of Fisherwomen in Coastal Fishing Communities of member-countries (Bangladesh, Maldives and Sri Lanka), and preparation of reports based on the reviews.

- National Workshops in member-countries to discuss the findings of the review and formulate an action plan.

(III) **Fisheries Resource Management**

- Assessment of the marine fishing fleet of member-countries.

- Organisation of a Regional Consultation on Monitoring, Control and Surveillance (MCS).

- Preparation of a management plan for one commercial fishery in each member-country.

BOBP-IGO's report for 2004-2005

Dr Y S Yadava presented the organisation's report for the period October 2004 - December 2005. He pointed out that some of the regular activities suffered because of the tsunami, which demanded immediate attention. The Governing Council complimented the BOBP-IGO on the number and variety of activities undertaken by a body of its modest size. Some comments on the report:

- The delegate from Bangladesh expressed his government's interest in resource assessment models for coastal and deep-sea fisheries and in alternative livelihood strategies for fisherfolk who collected shrimp post-larvae. Bangladesh was not hit directly by the tsunami; but in view of reports about the changing composition of fish species, and of coastal fish migration taking different patterns after the tsunami, participation in tsunami-related consultations would be useful.

- The Indian delegate said the recent census on marine fisherfolk would help planning processes relating to small-scale fisheries. He enquired whether BOBP-IGO could provide training and technical support in ornamental fisheries. (In response, Dr Yadava said that IGO could do so. A report on the status of ornamental fish trade in India is being finalized.)

- The delegate from Maldives said his country would like to see more collaboration with BOBP-IGO. He said the increasing pressure on reef resources in recent years called for serious interventions.

- The delegate from Sri Lanka suggested that BOBP-IGO should update publications produced during the first and second phases of BOBP. Assistance was requested for a detailed survey on the marine fisherfolk of Sri Lanka.

- The Secretariat said a Regional Workshop on MCS was proposed to be conducted in Bangladesh during mid-2006.

- The FAO would soon publish Technical Guidelines on Small-Scale Fisheries, the FAO delegate said.

- Observers from INFOFISH and SACEP welcomed closer co-operation with the BOBP-IGO. The SACEP representative expressed her organisation's interest in issues related to coastal livelihoods and marine and coastal protected areas.

- The Governing Council suggested that the Secretariat engage some more qualified staff to meet the many requirements stated by member-countries.

Presentations by Observers

The representative of NACA said his organisation could work together with BOBP on socio-economic uplift of small-scale fishers and fish farmers. The representative of SACEP said her organisation's priorities related to marine and coastal protected areas and natural disaster management. SACEP could work with BOBP on sustainable livelihoods.

The FAO representative described the progress of FAO-related projects on tsunami rehabilitation, the Bay of Bengal Large Marine Ecosystem and the Asia-Pacific Fisheries Commission (APFIC). He said that FAO was the lead organisation for tsunami rehabilitation activities in Sri Lanka and Indonesia. Reconstruction programmes included aquaculture, harbor infrastructure and improved livelihoods.

The Governing Council of the BOBP-IGO

The Governing Council is the supreme body of the BOBP-IGO. Every member-country is represented on the council; it meets every year; special sessions can be convened at the request of two-thirds of the members.

The First Meeting of the BOBP-IGO's Governing Council was held in Chennai from 7 to 8 September 2004.

The Governing Council determines the organisation's policy, its work programme, budget. Decisions are taken by a two-thirds majority, with due weight given to the recommendations of a Technical Advisory Committee. The Governing Council lays down standards and guidelines for management of the BOBP-IGO. It evaluates activities, including the accounts, appoints the director of the organisation and determines his conditions of service, formulates and adopts financial and administrative regulations, approves formal arrangements with governments and other institutions.

The Technical Advisory Committee established by the Governing Council advises the Council on all technical aspects relating to the organisation's activities. It will have one representative from every member-country, known for special competence and expertise in coastal fisheries. It will meet at least once a year, also at any time as requested by the Governing Council, and adopt a report which will be submitted to the Governing Council for its endorsement.

He said the proposed Regional Consultative Forum to be organised from 16 to 19 August 2006 in Kuala Lumpur, Malaysia, would discuss "Reforming Fisheries and Aquaculture", and cover areas such as the future of fisheries, co-management and governance and policy changes.

The Governing Council accepted in principle the proposal on secondment of technical personnel from member-countries to the Secretariat for a period ranging from 12 -18 months. But some delegates felt it might be difficult for their Governments to pay salaries for staff seconded to the BOBP-IGO.

Report of the Technical Advisory Committee (TAC)

The Governing Council endorsed the report of the first meeting of the IGO's Technical Advisory Committee (held in Maldives on September 4-5, 2005) as presented by the Secretariat. The TAC had agreed on a set of long-term thrust areas for the BOBP-IGO, as follows:

- Capacity-building for long-term interventions and strategies for safety at sea of artisanal and small-scale fishermen;
- Capacity-building for implementation of MCS programmes;
- Joint assessment of fish stocks through collaborative and participatory arrangements among member-countries. Assistance of major fisheries institutions in the member-countries could be availed for such a programme. The BOBP-IGO could provide an input to initial costs, and external funding could be sought.
- Development of management plans for important fisheries such as hilsa (*Tenualosa ilisha*) and shark fisheries.
- Information and Networking to assess and strengthen the networking capacity of the BOBP-IGO's member-countries; build the capacity of member-countries to integrate electronic media into their day-to-day operations; and develop networks among BOBP-IGO stakeholders at the regional level to share knowledge, experiences and best practices.

During discussions on the TAC report, the Indian delegation suggested that Bangladesh and India could cooperate on disease prevention in shrimp aquaculture, learning from each other's experiences. They could also reduce the spread of aquatic animal diseases from one country to the other. NACA could assist as necessary.

India also pointed out that the recent meeting of the BIMSTEC Technical Committee had suggested a role for the BOBP-IGO in two activities — assessing coastal fisheries stocks, and development and testing of a pilot-scale programme on a vessel monitoring system. Such a system could be a model for member countries in future. India also suggested FAO support for the proposed Regional Workshop on MCS in mid-2006 in Bangladesh.

Bangladesh suggested that issues related to safety at sea of poor fishermen be given priority. On fisheries surveys, India's fisheries institutions could be a role model and they could help train other member-countries. BOBP-IGO could initiate such training.

Sri Lanka described India's VMS programme as a good initiative. The BOBP-IGO could organise a visit by representatives of other member-countries to observe the working of the programme.

The FAO delegate complimented BOBP-IGO on highlighting the problems of member-countries in coastal marine fisheries through a prioritized list of activities. He suggested that FISHCODE could be approached to fund the MCS Regional Workshop.

Responding to a query from Bangladesh, Secretariat said that the IGO would support Fishermen's Week through awareness-creation activities and logistics.

The Governing Council proposed to hold its next meeting in late 2006 in the Maldives, subject to the government's approval.

Second Meeting of the
Governing Council
BOBP
12 - 13 December 2005, Colombo, Sri Lanka

Sri Lanka Holds Workshop on Code of Conduct for Responsible Fisheries

A National Workshop on implementation of the Code of Conduct for Responsible Fisheries was held in Colombo, Sri Lanka on 9-10 December, 2005. It was organised by the BOBP-IGO in association with Sri Lanka's Ministry of Fisheries and Aquatic Resources (MFAR). The National Aquatic Resources Research and Development Agency (NARA) hosted the two-day event.

Fifty-five participants representing leading fisheries institutions of Sri Lanka — such as the MFAR, Department of Fisheries and Aquatic Resources (DFAR), NARA, National Aquaculture Development Authority (NAQDA), National Institute of Fisheries Nautical Engineering, Ceylon Fisheries Harbor Corporation, and Central Fisheries Harbour Corporation – as well as NGOs, fisheries co-operative societies and the BOBP-IGO attended the workshop.

Mr H S G Fernando, Director, Ocean Resources, MFAR, served as facilitator for the Workshop's inaugural session. Dr Champa Amarasiri, Acting Director-General of NARA, welcomed the participants.

Dr Y S Yadava, Director of the BOBP-IGO, said in introductory remarks that the Workshop was meant to facilitate better understanding and more effective implementation of the CCRF in Sri Lanka. The Code could be adapted to suit the particular needs and circumstances of Sri Lankan fisheries. Implementing the Code has been one of the core activities of the BOBP-IGO, which is committed to taking the Code to fishers at the grassroots. He said the Workshop was being held against the backdrop of two important events – the December 2004 tsunami and the tenth anniversary of the CCRF.

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Mr E Jinadasa, Secretary, MFAR inaugurated the CCRF Workshop.

In his inaugural address, Mr E Jinadasa, Secretary, MFAR, said that in confronting the aftermath of the December 2004 tsunami, the Government was following the motto of "build back better".

The Workshop consisted of three technical sessions. The first heard eight invited presentations. During the second session, four groups of participants discussed select issues. Their recommendations were discussed and finalised during the third session.

Technical Sessions

Mr G Piyasena, Director-General, DFAR, discussed implementation of the CCRF in Sri Lanka. Outlining the structure of the fisheries sector in Sri Lanka and the responsibilities of different agencies, he said that know-how on the IPOA (International Plans of Action) was lacking in Sri Lanka, so were resources to implement them. The open-access nature of marine fisheries, the poor status of resource information, and lack of awareness about CCRF were other drawbacks to the implementation of CCRF.

Dr D E M Weerakoon, Director-General, NADQA, talked about inland fisheries and aquaculture and their sustainable development. He said that reservoirs constituted the mainstay of inland fisheries and steps were being taken to enhance stocks for culture-based fisheries. In coastal aquaculture, ***Penaeus monodon*** was the main species farmed in the North-West Provinces. The total area under shrimp farming was estimated at 4 500 ha by the end of 2004. The white spot syndrome virus and brooder shortage were some of the main constraints. However, steps have been taken to screen healthy brooders and provide quality seed to farmers.

Policies in inland fisheries and aquaculture were directed at achieving a total production of 60 000 metric tons by 2009. Dredging of the Dutch Canal would increase the carrying capacity of the area, and more farms could be set up in future. NAQDA is currently implementing regulations on inland capture, culture-based fisheries, shrimp farming; and best management practices in aquaculture.

Speaking on marine fisheries, **Mr G Piyasena** said that fisheries had been hit hard by the recent tsunami: some 4 870 fishers had died, 103 000 fisherfolk were displaced, 16 500 fisher houses were destroyed and 13 300 damaged. Some 24 000 fishing boats were either destroyed or damaged while 10 out of 12 fishing harbours sustained damage.

However, the pace of relief and rehabilitation had been rapid: 93 percent of the fleet was rehabilitated by November 2005. But a fall in fish production could not be avoided. Production during January - June 2005 was nearly 40 per cent less than that in the previous two years.

Mr Piyasena said that over-exploitation, use of illegal and harmful fishing methods, damage to critical habitats and user conflicts were some of the major problems faced by the sector. Some other issues: heavy reliance on the gill net fishery, imbalances in harvesting of resources, heavy post-harvest wastage. Dearth of reliable information on stocks and harvestable potential also impeded optimum exploitation.

Some major steps had been undertaken to "build back better" after the tsunami, such as striving for better-designed multi-day boats, improving on-boat handling and preservation, promoting sustainable fisheries management, engaging and empowering resource users, increasing export opportunities, building institutional capacities, improving safety at sea and ensuring minimum safety standards.

Mr A Hettiarachchi, Director-General (Development), MFAR, discussed trade in marine products. He said that fisheries accounted for 1.5 to 2.8 percent of Sri Lanka's GNP and met nearly 75 percent of the population's protein requirements. Shrimp, tuna, lobsters and shark fins are the main items of export. Sri Lanka's recently acquired GSP+ status would help promote exports to European countries; but it also imposed obligations relating to good governance and sustainable development. He said Rs 500 million had been allotted in the recent budget for setting up a new fish market in Colombo. He suggested a detailed survey of people in the fish trade.

Dr Ranjith Edirisinghe, who head's NARA's post-harvest technology division, dealt with post-harvest and quality control issues. Detailing the country's post-harvest infrastructure, he said Sri Lanka has 12 fishing harbours, 37 small landing sites and a central fish market situated in Colombo. About 79 to 87 percent of the fish is marketed fresh, 13 to 21 percent as dry. The private sector accounts for about 98 percent of marketing.

Mr A Hettiarachchi, Director-General, MFAR (top), Dr (Ms) Champa Amarasiri, Action Director-General, NARA (middle), Dr R Edirisinghe, Head, Post-Harvest Technology Division, NARA (bottom).

Mr G Piyasena, Director-General, DFAR, discussed the present status of implementation of the Code in Sri Lanka.

Sixteen EU-approved factories in the country comply with export regulations.

The tsunami has damaged post-harvest fisheries to the extent of Lankan Rs 260 million. It has also reduced production of fish (by about 28 percent) and per-capita consumption, and contaminated the quality of ice and water. The immediate and long-term needs of the marketing sector are to renovate or re-establish fish markets and auction halls, promote the use of ice boxes, modernise fishing vessels to include on-board preservation and processing, identify market opportunities for fishery products, and raise public awareness on hygienic handling of fish and on preventing wastage.

Dr S S Tabrez Nasar of the BOBP spoke about information networking and extension linkages. He stressed the need for better awareness and knowledge of fisheries management, sustainable exploitation and conservation; linkages among individuals and organisations; and networking. He said that facilities in print and electronic media, as well as recent developments in information technology, could be tapped to strengthen networking.

Discussing gender issues in fisheries and aquaculture, **Dr Rekha Maldeniya** of NARA said that women are active mainly in fish processing.

Most fisheries programmes supported male-oriented activities, she said, because women in fishing communities lacked clout both collectively (they are not organised) and individually. To make matters worse, the tsunami had made widows of many fisherwomen; they were now fully responsible for maintaining their families. She urged a more gender-sensitive approach in fisheries, development of women's cooperatives, and creation of a national network for women in fisheries. Projects should target men and women together, not separately.

Group discussions (top) and technical presentations (bottom) highlighted the meeting.

Dr Champa Amarasiri of NARA spoke about research support to CCRF implementation, which is at present provided by NARA and a network of 13 universities. With a staff strength of 325 including 40 researchers, NARA is active in nine major research areas; it also helps out with legislation on fisheries and aquaculture. It supports post-tsunami research in three areas — impact of the tsunami on fishing habitats and communities; rehabilitation monitoring; and sea-level monitoring for an early warning centre. Dr Amarasiri said that NARA offices and facilities had suffered heavy damage from the tsunami.

Group discussions and recommendations

After the eight technical presentations, participants formed four groups to discuss critical issues in detail.

Group I discussed marine resources, stock assessment and production potential, crafts and gear, safety at sea, tsunami rehabilitation, FAO Plans of Action, policy and legal issues. Group II discussed inland fisheries and aquaculture resources, production potential and sustainability issues, FAO Plans of Action, policy and legal issues, etc.

Group III discussed post-harvest and value addition, marketing, eco-labelling and other trade-related matters, impact of globalisation, subsidies in fisheries, policy and legal issues. Group IV discussed extension linkages, information networking, gender in fisheries, welfare programmes, research programmes, tsunami rehabilitation, policy and legal issues, etc.

During the third technical session, the four groups presented their observations and recommendations. A few specifics:

- Fisheries societies should be set up and strengthened in major and medium-size reservoirs. Ultimate objective: A Fisheries Management Authority.
- Community-based fingerling production should be encouraged in mini nurseries. Facilites should be set up to screen broodstock.
- Reservoirs should be enhanced by stocking with tilapia species. Reservoirs where an Indian carp fishery has been established should be enhanced with the same varieties.
- Advanced technology should be provided to aquaculture development centers for preserving genetic material for spawning activities.
- Farmer organisations should be strengthened.
- Shrimp farming should be promoted in new areas, especially in the southern and eastern coasts.
- State marketing organisations should help promote the processing and marketing of shrimps.
- Research and development of commercially important seaweed should be promoted both for aquaculture and for research and development (breeding and fattening of sea cucumber juveniles in pens for the export trade).
- Safe and wholesome fish products for consumers should be encouraged by developing awareness at the school and community levels; developing awareness among traders through the mass media on maintaining the freshness of fish; introducing a national safety and quality assurance system; and by reviewing existing rules and regulations on fish trade and quality assurance.
- Raising awareness on the need for change in the social attitude towards widows. Recognition of the role of women in fisheries.
- Development of non-formal education schemes for fisher communities, better health facilities, and alternative income generating activities.

Mr Hettiarachchi thanked the BOBP-IGO for organising the Workshop. Dr Yadava thanked the participants for their contributions, and the MFAR and NARA for the excellent Workshop arrangements.

The BOBP-IGO has held similar workshops in other member-countries also. In India, a National Workshop on the Code of Conduct for Responsible Fisheries was held from 29-30 September 2000, in Bangladesh on 23-24 April 2002 and in Maldives during 18-19 January 2004.

National Workshop
on the Code of Conduct
for Responsible Fisheries
BOBP

Database on Fisheries Scientists and Institutions in the Bay of Bengal Region

The BOBP-IGO proposes to set up databases of scientists and scientific organisations in the region active in fisheries, aquaculture and related activities. A decision to this effect was taken at the recent Colombo meeting of the BOBP-IGO's Governing Council. The databases will focus initially on member-countries of BOBP-IGO.

The databases will facilitate sharing and exchange of information and knowledge among individuals and institutions of the region. Such information can also be accessed through the BOBP website by a global fisheries audience, thereby expanding opportunities for development and co-operation.

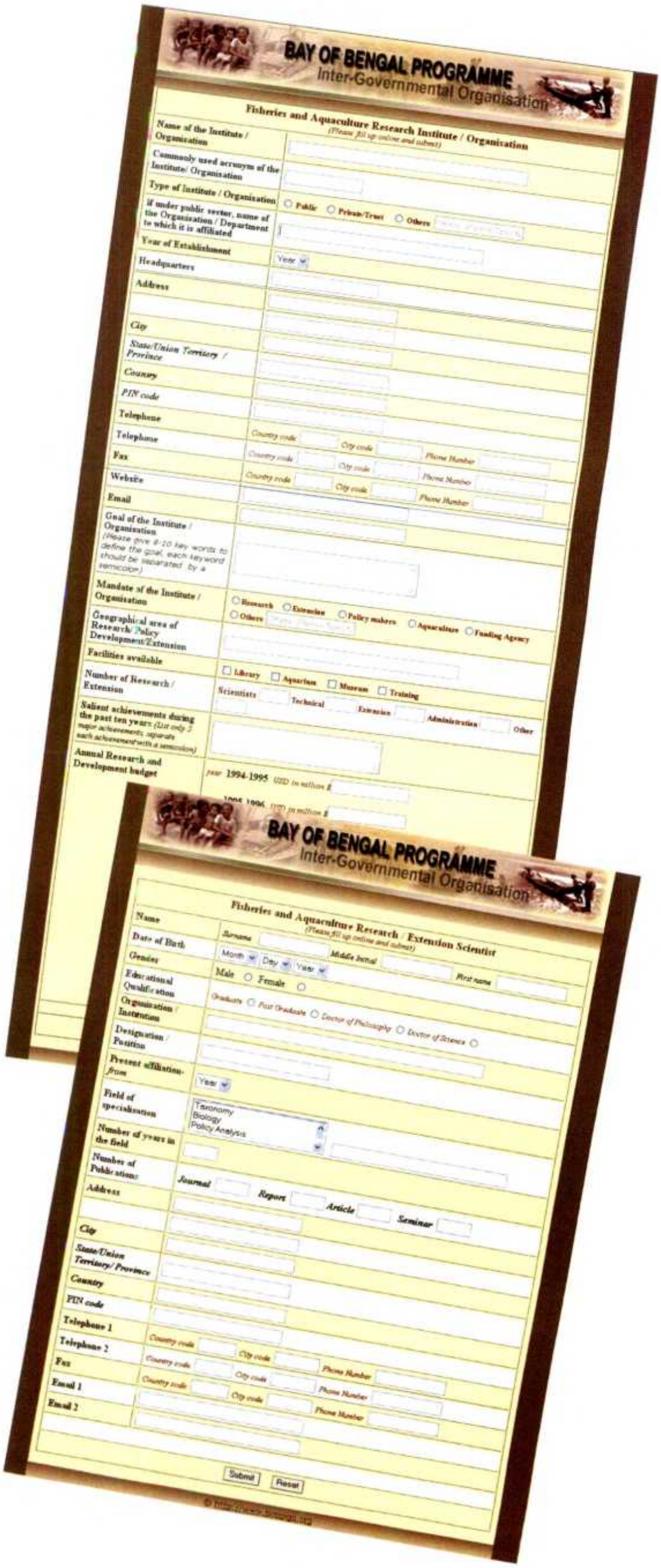
"There is a large pool of fisheries scientists from many disciplines in the Bay of Bengal region," says Dr Y S Yadava of the BOBP-IGO. "But in the absence of a database, it is often difficult to identify the right scientist for a development project. Further, linkages among these scientists are poor. An information mechanism to link them would be a great asset."

"The same problem exists as regards fisheries institutions," says Dr Yadava.

"Not many scientists outside India know about all of India's fisheries institutions. Likewise, scientists in India are not fully aware of other institutions in the region."

Scientists from member-countries are invited to log on to our website www.bobpigo.org, or the link http://www.bobpigo.org/database.htm and fill up the form **Information for Individual Scientists.** Organisations may fill up the form for **Organisational information**.

Kindly submit the completed forms online by **31 March 2006.** We will compile them, add the necessary hyperlinks and post the information on the BOBP-IGO website by 01 May 2006. Subsequently, a directory will also be printed and distributed within and outside the region.



Fisheries and Aquaculture Research Institute / Organisation
(Please fill up online and submit)

Name of the Institute / Organisation
Commonly used acronym of the Institute/ Organisation
Type of Institute / Organisation ○ Public ○ Private/Trust ○ Others
If under public sector, name of the Organisation / Department to which it is affiliated
Year of Establishment Year
Headquarters
Address
City
State/Union Territory / Province
Country
PIN code
Telephone
Telephone Country code City code
Fax Country code City code Phone Number
Website Country code City code Phone Number
Email Phone Number
Goal of the Institute / Organisation (Please give 8-10 key words to define the goal, each keyword should be separated by a semicolon)
Mandate of the Institute / Organisation ○ Research ○ Extension ○ Policy makers ○ Aquaculture ○ Funding Agency ○ Others
Geographical area of Research/ Policy Development/Extension
Facilities available ☐ Library ☐ Aquarium ☐ Museum ☐ Training
Number of Research / Extension Scientists Technical Extension Administration Other
Salient achievements during the past ten years (List only 5 major achievements, separate each achievement with a semicolon)
Annual Research and Development budget year 1994-1995 USD in million $
1995-1996 USD in million $

Fisheries and Aquaculture Research / Extension Scientist
(Please fill up online and submit)

Name Surname Middle Initial First name
Date of Birth Month Day Year
Gender Male ○ Female ○
Educational Qualification Graduate ○ Post Graduate ○ Doctor of Philosophy ○ Doctor of Science ○
Organisation / Institution
Designation / Position
Present affiliation-from Year
Field of specialisation Taxonomy Biology Policy Analysis
Number of years in the field
Number of Publications Journal Report Article Seminar
Address
City
State/Union Territory/ Province
Country
PIN code
Telephone 1
Telephone 2 Country code City code
Fax Country code City code Phone Number
Email 1 Country code City code Phone Number
Email 2 Phone Number

The database forms for fisheries organisations (above) and fisheries scientists (alongside).

Sri Lankan child-artists react to the tsunami

The young artists' work drew praise from the judges as well as from professional artists.

Scenic Panadura in Kalutara district, Sri Lanka, is a 90-minute drive out of Colombo. The tsunami has left its tell-tale marks all along the drive. But the people of this town have left the trauma of 12/26 behind them.

Many of the tsunami's survivors – adults and senior citizens – have since spoken about the tsunami, but children have not. The BOBP-IGO therefore decided to let some talented schoolchildren express their viewpoint creatively, artistically, broadening awareness among the young on the value of our coastal and marine environment.

An on-the-spot art contest for schoolchildren of Sri Lanka was held at Shri Sumangala Girls School, Panadura, some 40 miles from Colombo, on December 8, 2005. The theme: "Life after the tsunami". Forty eight students from 15 schools took part. Twenty eight juniors (ages 11 to 13) used crayons, 20 seniors (ages 14 to 17) displayed their water-colour skills.

The event began with a traditional lamp-lighting ceremony. Ms Sampathini Nepala, Headmistress, said her school felt honoured to host the event. Dr Y S Yadava, BOBP-IGO Director, thanked Ms Nepala and her school. He said similar contests conducted earlier in Tamil Nadu, India and in the Maldives, were a sparkling success.

The setting for the Panadura contest was most appropriate: native paintings adorned the walls. Six judges — Mr W Gunasinghe and Ms Susila Abeyasinghe (both art instructors at the Zonal Education Office, Kalutara); Mr Shanta Bhandara, Director, Planning and Monitoring of the Ministry of Fisheries and Aquatic Resources (MFAR); Mr M A Wijepala and Ms W W M C Geetharani (art teachers both) and BOBP-IGO artist S Jayaraj – were to pick first, second and third prizes and five consolation prizes for each of two categories – 16 prizes in all.

The Contest & the Paintings

The 48 child-artists were a picture of concentration throughout the 150-minute contest. BOBP-IGO artist S Jayaraj was all praise not merely for their focused interest and commitment but also for the work they turned out. He remarked "Almost all the paintings filled the canvas. This reflected the rich imagination of these kids and their maturity. The figures they drew were full figures, anatomically accurate – no symbols or half-figures. Consciously or unconsciously, they used techniques such as surrealism, palette-knife, or paintings layer-by-layer."

The first prize winner in the senior category (by Ms Amanda Gunawardena, Panadura) was in the surrealist style. It showed a wall under construction and five figures of men and women – three busy, two others in pensive contemplation. The second prize-winner among seniors (Ms Shashikala Chathurani Peiris) showed a woman vegetable vendor under a tent bargaining with a male customer. On the background: two fishermen about to go out on their craft. The third prize among seniors (by Ms Nimmi Shiranthi Fernando, Panadura) did an engaging painting of two neat little huts, two women

On-the-spot Art Contest
"Life After Tsunami"

Facing page: The young artists busy at the contest. Students receiving certificates from Dr Y S Yadava (top) and Mr A Hettiarachchi (middle). A dance presentation by Sri Sumangala Girls School at the Art Contest (bottom).

engaged in cleaning, two children busy with pottery, a man busy brick-laying. "Look at the full figures," Jayaraj comments.

The first prize winner in the junior category (Chamari Madushika Samaraweera) drew a smart little housing colony. Jayaraj praised "the tight organisation, the symmetric pattern of the houses, the very even colours."

One colourful painting showed multiple activities — beach seining, house building and watering of plants. A physically challenged youngster who came to the contest in a wheel chair drew an aerial view of reconstructed houses. He won a consolation prize.

Dr Yadava remarked on the "positive attitude and viewpoint" of almost all the paintings. He also noted that girls outnumbered boys in all the art contests – whether in India, Sri Lanka or the Maldives. Does it reflect the fact that painting as an art form today attracts girls, while boys are drawn more to cinema and television? Perhaps.

The art contest captivated parents and teachers alike. They praised the theme of the art contest, the organisation, the opportunity it gave the students. Said the mother of one student, who was physically challenged: 'This is the first art contest my son is taking part in. It is a proud moment for us. It's wonderful to see my son's excitement."

An art teacher commented "This contest was very different from all others. The awards were cash prizes. The materials needed for the contest, such as crayon boxes and water-colour paint boxes, were made available by the organisers themselves – a great help since some of the children would not have been able to afford them."

All artists were given certificates of participation immediately after the contest, much to their excitement. The parents were very pleased at the quality of the certificates – bright, laminated and therefore durable. "This will last long," said one of them.

A surprise item followed the painting contest – a dance show by a group of girls from the host school, the Shri Sumangala Girls School, Panadura. Clad in eye-catching traditional maroon-and-yellow costumes, the girls did a graceful folk dance on stage that captured their pride, their vivacity, their ***joie de vivre.*** It was as if the youngsters said: "It will take much more than a tsunami to get our spirit down."

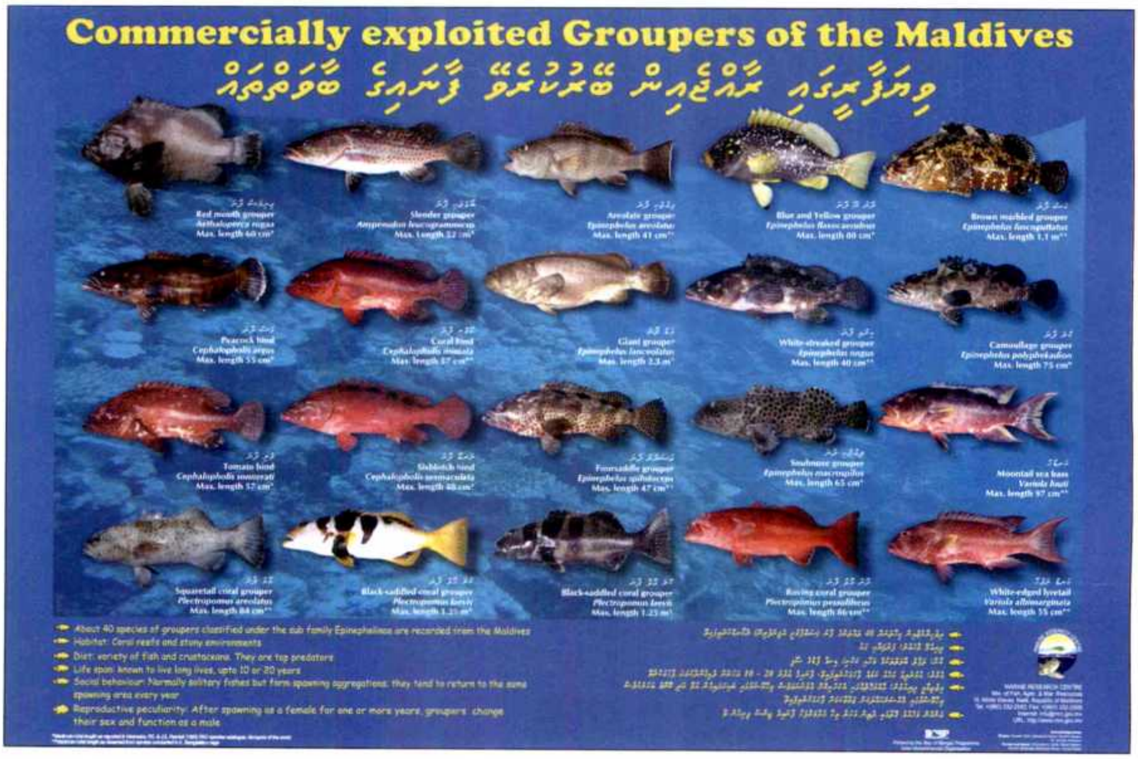
The art contest prize-winners were honoured at a special ceremony on December 10 at the office of NARA (the National Aquatic Resources Research and Development Agency), where the National Workshop on Code of Conduct for Responsible Fisheries was being held. Workshop participants cheered as Dr A Hettiarachchi, Director-General, MFAR, and Mr G Piyasena, Director-General, Department of Fisheries and Aquatic Resources, gave away the prizes.

The contest was made possible through the energetic co-operation of the Ministry of Fisheries and Aquatic Resources, particularly Mr H S G Fernando, Director, MFAR.

Does catharsis stimulate art? Most certainly, yes! The Panadura art contest provided stunning proof.

— Text by Tabrez Nasar
Photographs by S Jayaraj

Protecting the Grouper: Maldives Poster Raises Awareness


Commercially exploited Groupers of the Maldives
Red mouth grouper
Aethaloperca rogaa
Max. length 60 cm*
Slender grouper
Anyperodon leucogrammicus
Max. Length 52 cm*
Areolate grouper
Epinephelus areolatus
Max. length 41 cm**
Blue and Yellow grouper
Epinephelus flavocaeruleus
Max. length 80 cm*
Brown marbled grouper
Epinephelus fuscoguttatus
Max. length 1.1 m**
Peacock hind
Cephalopholis argus
Max. length 55 cm*
Coral hind
Cephalopholis miniata
Max. length 57 cm**
Giant grouper
Epinephelus lanceolatus
Max. length 2.3 m*
White-streaked grouper
Epinephelus ongus
Max. length 40 cm**
Camouflage grouper
Epinephelus polyphekadion
Max. length 75 cm*
Tomato hind
Cephalopholis sonnerati
Max. length 57 cm*
Sixblotch hind
Cephalopholis sexmaculata
Max. length 48 cm*
Foursaddle grouper
Epinephelus spilotoceps
Max. length 47 cm**
Snubnose grouper
Epinephelus macrospilos
Max. length 65 cm*
Moontail sea bass
Variola louti
Max. length 97 cm**
Squaretail coral grouper
Plectropomus areolatus
Max. length 84 cm**
Black-saddled coral grouper
Plectropomus laevis
Max. length 1.25 m*
Black-saddled coral grouper
Plectropomus laevis
Max. length 1.25 m*
Roving coral grouper
Plectropomus pessuliferus
Max. length 66 cm**
White-edged lyretail
Variola albimarginata
Max. length 55 cm**
MARINE RESEARCH CENTRE

- About 40 species of groupers classified under the sub family Epinephelinae are recorded from the Maldives
- Habitat: Coral reefs and stony environments
- Diet: variety of fish and crustaceans. They are top predators
- Life span: known to live long lives, upto 10 or 20 years
- Social behaviour: Normally solitary fishes but form spawning aggregations; they tend to return to the same spawning area every year
- Reproductive peculiarity: After spawning as a female for one or more years, groupers change their sex and function as a male

Groupers are an important reef fish in the Maldives, which depends heavily for food, export earnings and tourism revenues on its coral reef system.

But stocks of grouper are said to be dwindling, and sizes of catch thinning. Earlier fished only for local consumption, groupers have in recent years been heavily fished for export to China, Hong Kong and Taiwan. Besides Maldives, several Caribbean, South Pacific and Indian Ocean countries have also reported dwindling stocks of grouper.

Groupers are normally solitary fish, but they gather in "spawning congregations" during full moon, normally between September and November. Local fishermen are now aware of the exact times and days when groupers gather for spawning. This makes the spawning groupers very vulnerable.

As part of a management and awareness-raising campaign for groupers, the Ministry of Fisheries, Agriculture and Marine Resources (MOFAMR) in the Maldives is using an attractive poster on commercially-exploited groupers of the Maldives. The poster was prepared by the Marine Research Centre of the MOFAMR and printed by the BOBP-IGO.

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation(BOBP-IGO).The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

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Improving safety and health among fishers:

A major challenge in small-scale fisheries

The safety and health of fishers now rank foremost among the concerns about small-scale fisheries. At two recent conferences at Mahabalipuram near Chennai, experts examined several facets of safety and health. This issue of ***Bay of Bengal News*** *sets out their ideas and recommendations.*

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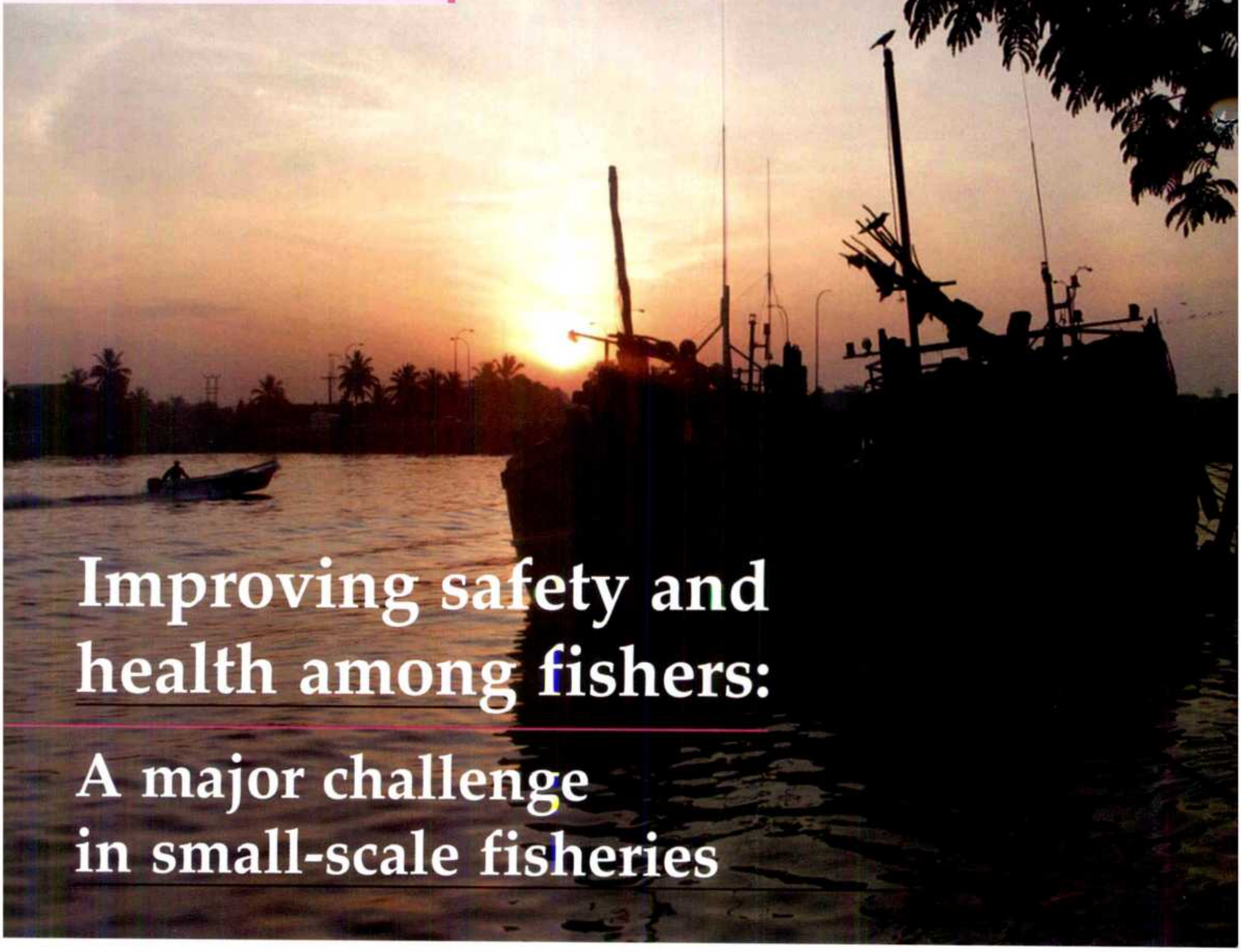


Improving safety and health among fishers:

A major challenge in small-scale fisheries

The safety and health of fishers is paramount among small-scale fisheries issues that call for urgent action. Governments, fisher associations and the community must address the issues head on. Recommendations from IFISH 3 and from a post-tsunami workshop held recently at Mahabalipuram, India, must be taken up in right earnest.

Safety and health in the fisher community. The subject threatens to become an embarrassment. Despite strong vocal support and a show of hands at conferences, there seems little to show by way of action. Fishers themselves, who once regarded health and safety as occupational hazards, now look upon it with fear and awe. The sea is no more a benign mother and provider: she bristles with menace and peril. 12/26 changed many things – most of all, perhaps, the cozy equation between fishers and the sea.

During the past two decades, small-scale fisheries in developing countries has undergone fundamental changes. It is no longer a near-shore coastal fishery. Small boats are going deeper and deeper in search of fish and profit, and embracing ever-greater risks.

Fishing technologies have improved, but boat construction norms and use of safety and communication equipment have failed to keep pace; and boat and engine maintenance have been non-existent. Result: avoidable accidents. Fishers encounter bad weather, cyclonic storms, tsunamis — often with little warning. Their own indifference to safety at sea has influenced neglect by those who are concerned with the welfare of fisher communities. A safety net for small heavily modified vessels that go offshore is urgent.

The BOBP-IGO, in association with the FAO and the Alaska center of the National Institute of Occupational Health and Safety (NIOSH), USA, recently organised IFISH 3 (the Third International Conference on Fishing Industry Safety and Health Conference) at Mahabalipuram, near Chennai. From 1 to 4 February 2006, participants from 13 countries debated a range of issues concerning the safety and health of fishers. While the conference addressed both commercial and small-scale fisheries, the focus was on small-scale and artisanal fishers, the most vulnerable group.

A two-day workshop on Post-tsunami Revival of the Fisheries Sector and Rehabilitation of Fishing Communities followed IFISH 3 at the same venue. The workshop discussed rehabilitation and livelihoods issues, also the over-supply of poorly designed and constructed FRP fishing boats, the consequent increase in fishing effort, and in some cases the mismatch between boats and engines. Details are recounted elsewhere in this issue of ***Bay of Bengal News.***

The two events synthesized some success stories and experiences from commercial and small-scale fisheries. They also raised the profile of safety and health issues among fishers, especially in the small-scale sector. The box on page 3 outlines some important recommendations.

Some important recommendations for small-scale fisheries

Create awareness and disseminate information using both print and electronic media.

Register all boats and implement monitoring, control and surviellance programmes.

Evolve guidelines for vessels below 12 meter.

Certify boatyards.

Enforce on-board safety inspections.

Provide communication and navigation equipment on-board fishing vessels.

Develop community health models.

Improve data collection, compilation and its dissemination to user groups.

Provide training to fishermen on sea safety measures.

Identify cost-effective communication mechanisms.

Include sea safety as an integral part of fisheries management and development.

The FAO's biannual publication, "The State of Fisheries and Aquaculture - 2004" says that about 28 million fishers engaged in fishing operations worldwide in 2002. Asia, where small-scale and artisanal fishers dominate, constitutes about 84 percent of the total fisher population. Data on fishing-related deaths may be relatively accurate for developed countries, but the picture is much less clear for developing countries. Data on accidents and their causes, on fatalities at sea and on shore, and on search and rescue operations are hard to come by. Developing and strengthening mechanisms for data collection, leading to the right management interventions, are a high priority

The FAO publication also estimates about 1.3 million decked vessels and 2.8 million undecked vessels, 65 percent of which are not powered. Of these, about 85 percent of total decked vessels, 50 percent of powered undecked vessels and 83 percent of total non-powered boats are concentrated in Asia. Such large fishing fleets, especially in Asia, operate in an open access regime with little or no fleet management. Regulated access to fisheries and sound fleet management

GOLDEN FISH

programmes will help enhance the safety of fishers, especially in developing countries.

Data on health too is sparse. Example: statistics about AIDS in small-scale fishing communities, especially where fishers migrate seasonally to other areas or work onboard larger fishing vessels. Once affected by AIDS, the workers serve as carriers of the disease.

Health issues also take us to the prevailing labour standards in the fishing industry. The many labour instruments in fisheries address mainly the crew of larger vessels. Small-scale vessels are excluded from their scope. The ILO is in the process of revising and updating some of the older standards, and it would be worthwhile if the revised standards adequately address the needs of the small-scale sector.

Similar global instruments are urgently needed on safety parameters for small-scale fishing vessels too. Such global initiatives will foster and catalyse action at national and regional levels.

The post-tsunami scenario concerning FRP fishing boats is scary. The thrust has been on more and cheaper boats; construction norms have not mattered, nor the quality of materials; neither scientists nor officials have been consulted. Plenty of 'bad' boats have been delivered to gullible fishermen. It is essential to segregate such boats to ensure that they do no harm. Their deployment should be considered only if they can be made sea-worthy.

If governments have neglected the safety and health of fishers, what about fisher groups? They have been engaging governments on fishing rights, access to markets, improved infrastructure for landing and berthing, concessions in fuel and other inputs; but rarely have they discussed safety and health issues, which don't seem to figure on their agenda. The inevitable result: not merely more accidents and fatalities, but heavier government compensation burdens, more widows and destitutes, more migration to urban areas.

That prevention is better than cure certainly applies to fisher health and safety. An improved safety and health environment would mean substantial savings for government (by way of lower expenditure on death/ disability compensation and search and rescue operations). Such savings can be used to strengthen safety and health regimes.

To ensure an effective safety and health environment for fishers, programmes on sea safety should include fisher families, not fishers alone. The most brutal impact of a fisher's death is felt by the family. Wives and children can orient the mindset of fishermen toward safety and impart a safety culture more effectively than governments can. Community-based sea safety and disaster management programmes can be cost-effective and long-lasting. To achieve results quicker, the fisheries administrations must engage the Transport Ministry, the Coast Guard and other institutions.

The safety and health issues highlighted by the conference and the workshop constitute worthy challenges for the future. They have been met in many commercial fisheries. Increase awareness. Strengthen community participation. Make sturdy, reliable and cost-effective communication and navigation equipment available. Impart regular training. Make safety requirements for vessels and crew mandatory, and monitor compliance. More than anything else, lobby for a strong political will to address such issues. Conferences in future may then be able to tick off safety and health among fishers as achievements rather than challenges.

– Y S Yadava

Paintings by school children in India, Maldives and Sri Lanka depicting post-tsunami reconstructuion

Safety and health of fishers: Experts debate issues at international meet in Mahabalipuram, India

Glimpses – selective, recollective, not exhaustive – into the proceedings of the recent IFISH 3 conference held at Mahabalipuram, India. A fuller report is to be published later.

Fifty two fisheries scientists, researchers, doctors, planners and administrators from 13 countries took part in the Third International Conference on Fishing Industry Safety and Health (IFISH 3) at Mahabalipuram, near Chennai held from February 1 to 4, 2006.

Organised jointly by the BOBP-IGO, the FAO, and the Alaska Centre of the National Institute for Occupational Safety and Health or NIOSH, USA, the conference brought together experts from small-scale and commercial fisheries as well as from government, who debated many aspects of the subject.
Mr P M A Hakeem, Secretary to the Government of India, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, inaugurated the conference. Representatives of the three organising bodies – BOBP- IGO, FAO and NIOSH – spoke at the inaugural session.

Nine technical sessions with 30 presentations spread over three and a half days followed the inaugural session. Health and safety in the fishing industry were discussed in many aspects and dimensions. The sessions were devoted to:

- Worldwide safety challenges facing the fishing industry
- Regional approaches to sea safety
- Safety equipment and training of crew
- Injury prevention and health promotion
- Small-scale vessels (2 sessions)
- Fishing vessel and equipment design, guidelines, constructions
- Responding to the problem
- International standards and status reports

A panel discussion after the nine sessions reviewed the facts, opinions and viewpoints expressed and future action needed.

Mr P M A Hakeem, Secretary to the Government of India, lighting the traditional oil lamp

Inaugural Session

Dr S S Tabrez Nasar, Senior Programme Advisor, BOBP-IGO, welcomed participants. In introductory remarks, Dr Yugraj Singh Yadava, Director, BOBP-IGO, noted the eventful journey of IFISH from Sitka (where IFISH II was held) to Mahabalipuram. IFISH 3 would have materialised earlier, he said, but for the 26 December 2004 Asian tsunami.

Introductory remarks were also made by the Director, Department of Fisheries, Tamil Nadu, Mr D P Yadav. He voiced concern about the safety problems faced by the state's fisher community following the tsunami. He said that resources for sea safety programmes were limited in Tamil Nadu; the State Government was looking at other possible sources of funds. He urged IFISH 3 participants to share information about search and rescue practices in their countries.

Dr Daniel Gustafson, FAO representative in India and Bhutan, noted the excellent collaborations the FAO had with the Government of Tamil Nadu as well as with the BOBP-IGO. The FAO was also collaborating with the ILO, especially in the wake of the tsunami. Some detailed scientific research effort was needed on the tsunami's impact on health, he said. IFISH 3 afforded an opportunity to discuss sea safety issues in this part of the world. The proliferation of new boats in the post-tsunami period had safety dimensions too. Fisheries management was another major issue, and sea safety had to be examined in this context as well.

Dr George A Conway, Chief, Alaska Field Station of NIOSH, said it was a pleasure to join hands with BOBP-IGO and FAO to put this conference together. He appreciated the BOBP-IGO's efforts in this context. He acknowledged the support of Mr Brandt Wagner of the ILO.

In his inaugural address, Mr Hakeem noted that this was the first conference of its kind in India; safety and health issues are rarely the subject of international conferences. While IFISH 3 would discuss industrial and commercial-scale fishing, its focus would be on small-scale fisheries, which dominated the fisheries of developing countries.

The tsunami had killed a quarter of a million people, and made many more homeless and jobless. The absence of an early warning system and the lack of disaster management were mainly responsible for the scale of devastation. Absence of a proper system for boat registration, and of systematic data, compounded the problem of relief for fishermen. The tsunami had generated several lessons and forced a fresh look at the development agenda in India.

Mr Hakim said that the conference would seek to increase awareness and action on health and safety issues and infuse confidence among fishermen. He hoped it would suggest practical measures to implement safety norms. Emphasis should be on proper design and stability of craft and on cost-effective measures, and on special training for fishermen.

Some other issues that needed to be discussed were the introduction of a monitoring system for larger vessels, search and rescue programmes, and first aid for victims of injuries at sea, he said. IFISH 3 should take into account the Chennai Declaration of 2001 on sea safety for small and artisanal fishing vessels.

Speakers at the conference (L - R):
Top - Dr George A Conway,
Mr Ari Gudmundsson.
Middle - Dr Daniel Gustafson,
Dr P Paleri, Ms Ingrid Christensen.
Bottom - Dr Vu Van Trieu,
Mr Jim Sandkvist, Mr Hans Bage,
Mr G Piyasena.

The Third Internatio
g Industry Safety & Heal
- 4 February 2006 Mahabalipuram,

What follows is a brief summary, session by session, of what happened at the conference.

Session 1: Worldwide safety challenges facing the fishing industry

Speaking on "Commercial fishing mortality: a worldwide problem," **Dr George Conway** said the FAO estimated the annual worldwide fishing deaths at 26 500 (estimated workforce: 34.5 million). Better mortality estimates are needed, and causes of deaths and injuries should be better understood. The benefits of satellite weather prediction and of simple devices like floatation vests and hand-held radios should be made available widely to artisanal and subsistence fishermen.

Mr Sebastian Mathew, Programme Adviser to the International Collective in Support of Fishworkers, Chennai, discussed the proposed ILO standards on safety and health in the fishing industry. He said the Work-in-Fishing convention sponsored by the ILO was strict in relation to larger vessels but flexible with small-scale vessels. He pointed out that small-scale fisherfolk in India now fished all over the EEZ and even beyond. Distinct categories of owner-skipper and workers, and an employer-employee relationship, had emerged in some small-scale fishing vessels. So had some problems. Example: Who is to bear the cost of medical treatment of fishermen?

Discussing the ILO's work on the safety and health of fishers, **Ms Ingrid Christensen**, Sr Specialist on Occupational Safety and Health, ILO sub-regional office for South Asia, said that seven instruments on the work of fishers had been adopted by the ILO. These will be consolidated into a single comprehensive standard. The ILO has been collaborating with the FAO in re-establishing livelihoods in tsunami-affected areas. Low-cost improvements are necessary in small-scale fisheries to prevent deaths while fishing.

Session 2: Regional approaches to sea safety

Mr Hans Bage of FAO presented a paper on behalf of Mr Agnar Erlingson, FAO/BOBP-IGO consultant who had done a two-month survey of safety in small fishing vessels in India, Sri Lanka, Maldives and Thailand. (***Bay of Bengal News,*** December 2005).

Some points from the paper: There seems to be a lack of interest in the safety of fishing vessels below 12 metres. Guidelines should be evolved for such vessels too. (The FAO responded that guidelines had just begun for vessels under 30 metres in length.) Some restrictions on fishing should be stipulated for open-access systems. All boats should be registered. A distinction must be made between "disasters" and "personal injuries".

Mr G Piyasena, Director-General in the Department of Fisheries and Aquatic Resources, Sri Lanka, discussed the status of sea safety programmes for small and commercial fishermen. Tsunami relief effort had triggered a big rise in the number of fishing boats, but many of these boats were substandard. Some 500 to 600 canoes lie useless on beaches. The Government is framing regulations on boat construction with assistance from the FAO and the Government of Italy, while stock assessment would be initiated with donor assistance. Sri Lanka lacks an early warning system, also a sound system for vessel monitoring, control and surveillance.

During discussion, it was pointed out that a proper certification system for boats is lacking in Sri Lanka. Vessels are constructed by persons with traditional skills handed down from one generation to another. Some small vessels go deeper in search of fish, though they are not equipped to do so; they run into both safety and legal problems. One participant suggested that Sri Lanka's full fleet strength after the tsunami should be evaluated.

Mr Jim Sandkvist (Sweden) discussed the SSPA's Integrated Coastal Zone Development Programme and SIDA's International Training Programme for small fishing vessels in a presentation on "Small vessel safety – coastal fisheries development". He urged registration of small fishing boats, and better coordination between vessel monitoring and community participation programmes to strengthen safety at sea. He also suggested that safety training be imparted to wives of fishermen.

Session 3: Safety equipment and training of crew

Mr Alan Davis, safety & compliance manager of the American Seafoods Company which has 12 fishing vessels, made a presentation on "Safety eyes" – the effort to make everyone look out for safety hazards.

Mr Davis said that repetitive training, constant re-enforcement, management commitment and safety inspections had together ensured that more people in his company had developed "safety eyes". Just as fishermen are constantly scanning the horizon for signs of bad weather, they should scan surroundings for safety hazards, then take action to overcome them. Use goggles, he urged fishers at sea. It will mean less exposure to harmful rays, smaller incidence of cataracts.

Mr Ken Lawrenson of the US Coast Guard made a presentation on drills and training in the commercial fishing fleet of the Northwest United States. He said monthly drills and training were required by law in US commercial fishing vessels. Crew failure to put their gear to proper use was a major cause of fatalities.

Session 4: Injury prevention and health promotion

Prof Olaf Jensen, senior researcher from the University of Denmark, presented a paper that classified work processes and injuries in fishing vessels, thereby providing insights about injury patterns. The work processes most associated with injuries: preparing, shooting and hauling gear (44%), moving about the ship (14.7%), cleaning the catch and catch handling (13.9%). Fatalities accounted for 5 percent of all detected injuries.

Mr Grant Tracy, Director of safety of Standfast Corporation based in Brisbane, Australia, presented a paper on controlling the risks of falling overboard from fishing vessels. He said that floatation devices and immersion suits would preserve life while in water; to prevent the risks of falling overboard, a practical and safe working system was needed. This would include a self-locking, self-retracting deck tether attached to a personal floatation device.

Mr Bradley Husberg presented a paper by him and Jennifer Lincoln (both from the Alaska Field Station of NIOSH) on severe injuries that occurred on commercial fishing vessels in Alaska. Most of these occurred on deck during the deployment and retrieval of fishing gear. Between 1991 and 2002, 798 severe non-fatal injuries occurred. Falls accounted for 25 percent of these injuries; machinery and fishing equipment for 23 percent.

Session 5: Small-scale vessels-I

Mr Bundit Chokesanguan of SEAFDEC's training department described the status of sea safety programs for small-scale and commercial fishermen in Thailand. He said the responsibility for fishing vessel safety is shared by many government departments; this makes for ambiguity. A clear definition is needed about small fishing boats and their operational range. Radios carried by fishers in mechanised boats, storm warnings on radio and television, community programs carried out by fishermen's co-operatives – all these promote safety at sea. Poor equipment in commercial vessels was what most endangered safety at sea. In 2003, SEAFDEC organised a regional workshop on safety at sea for small fishing boats. Guidelines are being planned.

An IFISH 3 session in progress

Discussing sea safety awareness in small crafts, **Mr Mats Rosander-Liew** of the Swedish Maritime Administration said Sweden had 30 years of experience in making small craft better aware of safety. Television and other mass media played an important part in the process. Family members including women and children had to be approached for long-term success with adoption of safety measures. "They often constitute a powerful pressure group for behavioural change."

The speaker said a large number of small boats were active along a 2 700-km coast in Sweden. Sometimes the boat traffic was very heavy. The Swedish Government wished to reduce the casualty figures at least by half. This had been done in the Navy. Awareness programs are being disseminated to schools as well.

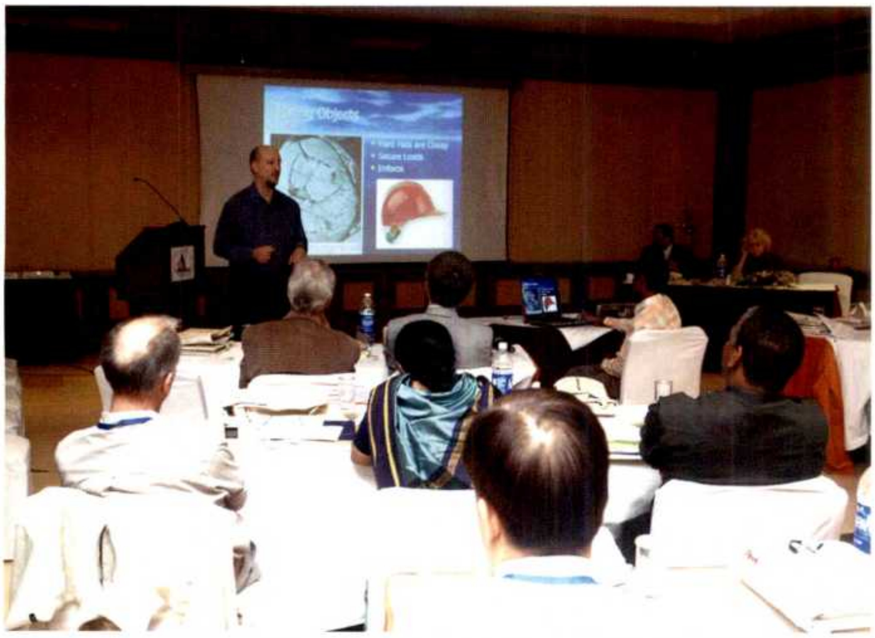
Mr D P Yadav, Tamil Nadu Director of Fisheries, described sea safety programmes for fishermen in his state. (See pages 30 - 32). In discussion following his paper, it was pointed out that 12 to 15 percent of fishermen go beyond 12 nautical miles from the shore. The Coast Guard is better geared for search and rescue operations than the state government. Efforts are being made to improve insurance coverage for boats.

Session 6: Small-scale vessels-II

Commandant N V Rama Rao of the Indian Coast Guard (ICG) described the economic dimensions of search and rescue operations. He said that SOLAS (Safety of life at sea) and GMDSS (Global maritime distress and safety system) regulations did not apply to small-scale fishing vessels. The ICG is responsible for protecting fishermen and assisting them at sea. The Indian region for search and rescue (SAR) comprises 4.6 million sq km. SAR entails an annual expenditure of approximately Rs 42 million. There is presently no SAR agreement with Sri Lanka, but SAR operations are carried out ad hoc by agreement. ICG is a lean and thin organisation; at present, 90 percent of its efforts are directed at fishermen. He felt the need for a low cost EPIRB, costing around Rs 10 000; right now, it costs five times as much. He urged fishermen to use the Coast Guard's toll-free number (1718) during emergencies at sea.

Dr Jonathan Dickson of the Bureau of Fisheries and Aquatic Resources in the Philippines described sea safety programs for fishermen in his country.

Commandant S D Sonak of the ICG made a presentation on "Issues associated with small-scale



Mr Alan Davis, American Seafoods Company, speaking on "Safety Eyes"

fishermen at sea". Making the point that small-scale boats vary in size and shape in each coastal state of India, he urged that identity cards should be issued to fishermen.

Dr Vu Van Trieu, Acting Director-General in the Department of International Cooperation, Viet Nam, described commercial fishing in his country. He said that fishing engages more than four million people; marine stocks in Vietnam are estimated at 4.2 million tonnes; small-scale fishing vessels are low-powered, equipment is rudimentary. Fishing vessels of horsepower greater than 90 H P are registered. He suggested regional cooperation in sea safety. Training-of-trainers is the *modus operandi* for training programs.

Session 7: Fishing vessel and equipment design, guidelines, construction, etc.

Mr Robert W McKibbin, mining engineer at NIOSH, Spokane, Washington, discussed the development of devices such as an emergency-stop system for a hydraulic deck winch. The instrument would cost about US $ 2 200 inclusive of fitting and welding charges, but the cost could go down if it is produced on a mass scale.

Dr B Meenakumari, Principal Scientist of the Central Institute of Fisheries Technology (CIFT), Kochi, India presented a paper on "Alternate material for small-scale vessel construction" co-authored with Mr M V Baiju and Ms Leela Edwin. The high cost and scarcity of conventional wood species are making alternatives necessary, and the CIFT is looking at them. The paper described an aluminium canoe, the process of constructing a rubber wood canoe, and the sheathing of a wooden canoe with FRP, and evaluated their techno-economic feasibility.

Dr V S Somvanshi, Director-General, Fisheriy Survey of India (FSI), described his organisation's vessel monitoring system (VMS). In co-operation with the Indian Space Research Organisation, a reporting system has been developed that gives FSI information from fishing vessels at sea about their position, depth, catch effort and species. Safety signals can be transmitted. It is proposed to extend the VMS to deep-sea fishing vessels and later to mechanised boats.

Dr Henri Pinon of the Institut Maritime de Prevention, France, presented a paper on sea safety studies conducted by his non-profit institute. It collects and analyses report forms that fishermen must complete in the event of injury. These provide data about the injured person, the ship and the type of fishing being done, the circumstances (date and hour, meteorological conditions, position of the ship, location of the worker, what he was doing when accident occurred) and the injury. The annual rate of occupational injury was 143 per 1 000 fishermen in sea fishing, as compared to just 44 injuries per 1 000 workers in other sectors.

Session 8: Responding to the problem

Dr Y S Yadava, Director of the BOBP-IGO, described the efforts of the IGO in co-operation with member-countries to improve safety at sea for small-scale fishermen. The Chennai Declaration of 2001 recommended a regional sea safety programme. During discussion, it was pointed out that lack of data on accidents and injuries was a major drawback. A data collection mechanism ought to be developed for use by member-countries of the BOBP-IGO.

Mr Than Oo Wai, Deputy Director, Department of Fisheries, Myanmar, discussed the status of sea safety programmes for fishermen in his country. He said that artisanal fishermen account for most of the catch. There is a registration system for fishing boats. Most fishermen use home-made life rafts such as plastic containers and drums, and traditional medicines. Most fishing boats operate in remote areas; communication with them is poor. Co-operation with regional and international organisations is needed to solve existing problems.

Discussing the role of gender in sea safety programmes, **Ms Chandrika Sharma** of the International Collective in Support of Fishworkers, Chennai, urged a comprehensive approach to reducing the vulnerability of coastal fishing communities to natural disasters on sea and land. It is women who have often taken the lead in highlighting problems of sea safety and in work conditions. During discussion on the paper, Dr George Conway said fisher groups in Chennai had told him that HIV/

AIDS was a major health concern. A community health model should be adopted to tackle this concern. He also lauded the micro-credit programmes of south Asia which were spearheaded by women and improved the quality of life of the community.

Session 9: International standards and status reports

Mr Ari Gudmundsson, Fishery Industry Officer, FAO Rome, described the evolution of international instruments on the safety of fishing vessels and fishermen, and the status of implementation. The FAO has prepared the FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels (Parts A and B) as well as the FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels. These documents have been revised recently and will be published soon. Mr Gudmundsson's paper also highlighted concern for small fishing vessels which are not covered by any standards. He said that a website had been set up for the purpose, and invited suggestions.

Replying to questions, Mr Gudmundsson said that one problem with safety standards for developing countries was absence of data. He urged participants to help in improving the status of data collection. Sri Lanka is being helped with documentation of sea safety programmes. He admitted that women and families have not been specifically addressed in any guidelines prepared so far. Safety instruments can be useful only if they are implemented and enforced; this is mainly the responsibility of governments. Political will is essential.

Mr Ali Majid from the Ministry of Fisheries, Agriculture and Marine Resources, Maldives, discussed sea safety programmes in his country. (Paper co-authored with Mr Ahmed Hassan.) He said that his government is presently working on developing vessel construction and standards and on providing technical support by introducing optimally designed and efficient fishing vessels.

Mr Hans Bage of the FAO mentioned the possibility of the Swedish International Development Agency (SIDA) funding a regional programme on sea safety in the Bay of Bengal region. It will be part of a global programme on sea safety.

Mr Dennis Hansford of the US Department of Commerce discussed "Safety standards for observer deployment in commercial fishing vessels". He said the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service trains hundred of fisheries observers annually. These observers are deployed on commercial fishing vessels. Safety training is provided to all the observers.

In the discussion at the end of this session, it was suggested that India's Planning Commission should address the question of safety of fishers in its 11th Five-Year Plan, something that had not been taken up in the past.

A participant suggested that representatives of the fisher community should also be invited in future IFISH. Another suggested a regional conference supported by the government that looked at specific regional issues.

Panel Discussions

A few of the many points made during a lively panel discussion that followed the nine technical sessions:

- In future, more stakeholders should participate in conferences of this kind.
- Awareness on sea safety issues should be promoted at all levels, starting from that of policy-makers. Language in such literature should be simple and clear to all.
- Knowledge on safety issues should become a part of the university curriculum. When government agencies give fishers a loan, they should exact a commitment from them about using safety equipment.
- The FAO requested participants to make available national regulations on sea safety.
- The conference did well in discussing both small-scale and larger fishing vessels. Many fishers today are going deeper or increasing their range, without the right know-how. Result: more accidents. All countries must make an effort to study what kinds of fishing activities are going on. Best practices should be documented and shared widely. A good balance is needed between 'hardware' and 'software'.
- Communication gadgets and equipment need to be modernized to improve sea safety. More group discussion needed among participants at such conferences, since the state of fisheries differs from one country to another.
- Short films can be very effective to promote sea safety. BOBP used to produce posters, these should be distributed and disseminated more widely and displayed.
- Such conferences are very useful for Europe, which used to be underrepresented in the past. Support from ILO and FAO has made this possible.
- US Coast Guard: Two important issues are insurance arrangements for fishers and use of weather-proof equipment. For a local fishermen here, GPS equipment would be most useful.
- Fishers need life jackets. The government should address this issue in its next Plan.
- Fishery Survey of India: FSI conducts several workshops for fishers – about new technologies, about diversifying and limiting the pressures on fishing grounds. A workshop was conducted in Goa in 2000 under FISHCODE. We would like to conduct more such workshops.
- NABARD: We would like a list of the many kinds of sea safety

equipment relevant to this region, and the cost. Also, is there any development strategy with multi-stakeholder participation to upgrade the knowledge of fishers?

- Denmark: No focus at this conference on injury prevention in fishing related activities. No precise or comprehensive data was available on fatal and non-fatal injuries. This can be obtained only by involving fishers, their families, politicians and epidemiologists.
- The Code of Conduct for safety of fishing vessels should be implemented. The Government of India's thrust in fisheries has been only on production, safety and management of fisheries has not been given priority.
- SEAFDEC: We need to obtain the views of fishermen. How can international instruments be implemented without their involvement?
- FAO: The cost of SAR operations must be lowered. Savings from such reduction could be used to subsidise sea safety measures. The FAO is working with Swedish authorities on sea safety interventions. Important components are data collection, regulation and community participation. Future IFISH meets should be so designed that the fisher community is involved. We must move IFISH from rhetoric to action.
- Sweden: This is our first IFISH meeting, and it will not be the last. There was so much to learn, and there were many issues. "We must endeavor to reach the local fishermen, this will be a big step for IFISH. At the next IFISH, results of activities carried out after IFISH 3 should be presented."
- Vietnam: Sea safety information should be disseminated through popular literature and TV. Fishers should be given the right knowledge in the right way. They will never react to a term like "Torremolinos".

US and Indian Government officials at the conference

- CIFT: No safety equipment in small-scale fishing vessels, no data on fatalities. We need to promote awareness, training and extension, with support from ILO and FAO. CIFE and CIFT should make sea safety a part of their curriculum. R & D Institutes should take up projects on safety equipment. Safety aspects should be made mandatory when bank loans are given.
- US Coast Guard: Future challenges concerning sea safety relate to government regulation, awareness, outreach programmes and data organisation and collection.
- CIFE: Mechanisms needed to collect data on sea safety. The CIFE website contains a compendium of all marine fisheries regulations in India. Social issues should also be looked at — such as the monsoon ban on fishing and keeping fishermen productive during this period. We can conduct training programmes for fishermen on sea safety.
- FAO: The CIFE compendium on maritime regulations, if made available to FAO, can help us prepare a global compendium on marine fishing regulations.
- The organisers should be congratulated for bringing IFISH 3 to the heart of fisheries, as Asia is the hub of small-scale fisheries.
- ICSF: (a) Sea safety and resource management are two sides of the same coin. Our mindset is attuned to near-shore fisheries. So even if small-scale fishers move offshore, we still talk about near-shore fisheries. (b) Sea safety depends largely on awareness, prevention and mitigation. We must document some of the best practices. Visual documents can be excellent awareness instruments. (c) We must define sea safety. Presently, many interpretations are given to sea safety. (d) We must follow the debate on sea safety in the WTO. It is generally negative about all subsidies, but does not question the subsidies given for sea safety. This development can be used to promote sea safety. We must also maintain a balance between hardware and software.
- SEAFDEC: We invite co-operation with BOBP-IGO, FAO and NIOSH in Southeast Asia. The media should be tapped to promote sea safety. SEAFDEC has competency in VCD production, we can help produce documentaries on sea safety. During the last 2 years, 20 VCDs have been produced on shrimp fisheries and other subjects.
- Maldives: Special monitoring centers are needed to monitor the

safety of small boats. Fishermen may be provided with VHF sets on an installment basis. Study tours and practicals should be a part of the programme for IFISH 4.

- FAO: SAR has become very expensive. VHF devices are the cheapest sea safety tool. Their range is up to 25 nautical miles, and it can be extended to 50-60 nautical miles. A cost-benefit study should be undertaken on available communication mechanisms for small-scale fisheries. For creating awareness on safety issues, travelling seminars or road shows would be useful.
- Indian Coast Guard: We have moved to the GMDSS system, and coastal radio station networks should be established. A common coastal radio network will be more useful than a network only for fishermen.
- US Coast Guard: Insurance and training should be important components of fishing safety. "If I were a local fishermen, I would use a 406 EPIRB that would give me weather warnings and GPS and also allow me to communicate with the family.
- Fishery Survey of India: The FSI has seven zonal bases, which conduct a dozen workshops every year for marine fishermen. These workshops focus mainly on resource management and demonstration of new equipment. But henceforth, such workshops could also cover sea safety and the health of fishers. FSI would like to conduct workshops on MCS in association with BOBP-IGO.
- NABARD: The skills of small-scale fishers should be upgraded, and support should be provided for the purpose. NABARD can fund entrepreneurship development programmes. We can include sea sea safety equipment in bank loan schemes if a list of such equipment along with cost is made available to NABARD.

Closing Session

"Agreement is nice but action is better," said Dr George Conway at the closing ceremony of the conference. He said that improvements are needed in the areas of communication, equipment & materials, training, community health approach, data collection and surveillance mechanisms.

Mr Ari Gudmundsson said case studies on safety improvement must be documented. Political will is essential to improve the safety of fishers worldwide.

Dr Prabhakaran Paleri (Coast Guard Director-General, New Delhi) said the Indian Coast Guard would be very happy to support measures to enhance the safety of small-scale fishers. He said that health, security and environment are correlated; so is the relationship between fishermen, boats and the environment. In conclusion he raised a few questions: Will the fishermen population increase or decrease? He also made the point that the SAR mechanism is oriented to merchant vessels and cannot really meet the requirements of fishermen. Can a different approach be designed for fishermen, a community approach?

(For more details on IFISH3 visit www.ifish3.org)

Participants at IFISH 3

The Third International
Fishing Industry Safety & Health Conference
1 - 4 February 2006, Mahabalipuram, Chennai, India

Reviving Fisheries after the Tsunami

What has been done to restore and rehabilitate fisheries and fisherfolk communities hit by the tsunami? What are the priorities now? Report of what was said and discussed at a workshop in Mahabalipuram, held on 6-7 February 2006.

The workshop on Post-tsunami Revival of Fisheries Sector and Rehabilitation of Fishing Communities was held in Mahabalipuram on February 6 and 7, 2006, at the same venue as the IFISH 3 conference. Some 46 persons took part, including representatives of fisher communities.

The tsunami was one of the worst tragedies in recent history and left fisher communities shattered, said Dr Yugraj Singh Yadava, Director, BOBP-IGO, in introductory remarks. While the immediate tasks of relief are over, the status of rehabilitation differs in various locales and countries. Livelihood restoration and rebuilding community confidence are two of the major challenges faced by governments and the civil society. He hoped that the workshop, being held in co-operation with the FAO and NIOSH, would prove useful.

Dr George A Conway of the National Institute of Occupational Safety and Health (NIOSH), USA, welcomed representatives of fishing villages near Mahabalipuram to the workshop. He said their first hand experience – both with tsunami devastation and with rehabilitation work — would be valuable. He hailed the success of local governments in preventing the outbreak of disease following the tsunami. There was room for improvement in tackling the psychological trauma of fisher communities after the tsunami. Sanitation and communication were other important issues.

Mr Ari Gudmundsson speaking at the inaugural session of the Workshop

Mr Ari Gudmundsson of the FAO expressed appreciation of the massive post-tsunami relief work undertaken by governments and others. The FAO too had contributed to relief work. The sheer scale of the tragedy was unprecedented, so more needed to be done. He hoped that the workshop would enable constructive debate on major issues.

Mr D P Yadav, Director, Department of Fisheries, Government of Tamil Nadu, said millions of people, mostly fishers, were displaced by the tsunami. The global community had responded splendidly with succour. In Tamil Nadu, local communities themselves coordinated and managed relief materials. He said we are almost back to normal today, but ought to deliberate on major issues raised by the tsunami and formulate new plans. The fishing community is quite amenable to joint planning and implementation. He said that the government has coped with the massive challenges of the tsunami, but the capacities and capabilities of the Department of Fisheries need to be strengthened.

Fisher community representatives present at the workshop were invited to the dais. One of them (P Vasu from the fishermen village, Mammalapuram) spoke about the tsunami and its impact (damaged infrastructure, boats and nets, repairs, health issues both physical and mental, livelihoods), and said the community needed further help.

A seven-minute silent video of tsunami clips, shot and put together by the BOBP-IGO, was shown. The inaugural session ended with a vote of thanks by Dr SS Tabrez Nasar.

Sessions 1 & 2: Post-tsunami revival of the fisheries sector and rehabilitation of fishing communities.

Mr Ari Gudmundsson moderated the first session, which featured three speakers – from Sri Lanka, Thailand and the Maldives.

In a comprehensive presentation, **Mr H S G Fernando,** Director (Ocean Resources) in the Ministry of Fisheries and Aquatic Resources, detailed the damage of the tsunami: it had affected 12 of the 14 coastal districts in Sri Lanka, killed 4 870 fishers and damaged nearly 17 000 houses. Ten out of 12 harbours, 37 anchorages and 200 fish landing centers were badly damaged.

The reconstruction policy aimed at "building back better," at rehabilitating fishing communities and restoring the fishing industry so that they were better than they were before the tsunami. Major projects under implementation were fisheries harbours at Panadura, Beruwala and Kudawella (with Chinese assistance), Tangalle and Galle (Japan), Mirissa, Puranwella and Hikkaduwa (USAID), ice plants, fish transport vehicles and cold storages (Japan). Selected anchorages would be improved with UNDP assistance funded by Japan, the Tangalle fisheries training center would be helped by Italy, and coast protection structures would come up with ADB assistance.

An FAO fisheries programme for recovery and rehabilitation, with funding support from several countries, covered many areas – fishing fleet, regulations on safety standards, infrastructure development plans, livelihood support. IFAD, GEF and ADB were assisting three major projects – relating to coastal rehabilitation, livelihoods, coastal zone restoration in the Eastern Province, and two fishery harbours.

Mr Bundit Chokesanguan of SEAFDEC's training department said the tsunami had affected six provinces of Thailand, killed nearly 5 400 persons, destroyed nearly 7 000 housing units, and inflicted damage on agriculture, coral reefs, mangroves and aquaculture. A government relief fund with a budget of 1.3 billion baht had been set up to provide compensation and to help fisheries and fisher communities. Under a proposed fisheries rehabilitation plan, fishing surveys would be carried out in several villages and a livelihoods workshop would be organised.

Mr Ali Majid from the Ministry of Fisheries, Agriculture and Marine Resources in the Maldives said the tsunami had killed 82 people in his country, deprived 1 600 people of livelihoods, and inflicted damage worth about US $ 25 million. The government's long-term policy was to leave everyone better off than they were before the tsunami. Support and technical assistance were being provided by Japan, the FAO, UNDP, World Bank, IFAD and Australia.

Under various elements of a fishing vessel replacement programme, damaged vessels would be repaired, new long-range vessels would be introduced, fishing gear, engine and equipment would be repaired or replaced. Through other programmes, boatsheds would be rehabilitated, fish processors would be provided with micro-credit, a Fish Aggregating Device Centre would be repaired, a mariculture station would be restored. Support would be provided for infrastructure (fish markets, chill containers, ice plants). Reef and marine resources would be assessed.

Some of the issues that confronted the authorities were lack of coordination between different agencies, delays in finalising implementation, with different donors expecting different arrangements, problems in finalising beneficiaries.

Mr D P Yadav, Director of Fisheries, Tamil Nadu, described relief and rehabilitation in his state. (See article on pages 30-32) Among policy interventions for tsunami rehabilitation, he cited the development of advanced warning systems for natural calamities, insurance coverage, setting up of shelterbelt plantations, modernisation of infrastructure, conversion of wooden kattumarams to FRP, training coastal communities in alternative livelihoods, diversification of the coastal economy.

Rehabilitation of
6 - 7 February 2006,

Speakers, clock-wise from left: Mr D P Yadav, Dr Chandrika Sharma, Mr R Devan, Mr Ali Majid

Tsunami workshop in progress

He mentioned some key issues to be addressed: community-based fishery resource management, strengthening of co-operative institutions in fisheries, enhancing the capacities of the Department of Fisheries, strengthening of its engineering wing, development of a domestic market for fishery products, improvement of market intelligence.

Dr N K Kittusamy of the Spokane Research Laboratory in NIOSH, described a rapid needs assessment of health care facilities in Banda Aceh, Indonesia, the country worst hit by the tsunami. Dr Kittusamy was part of an 11-member team that conducted two surveys to assess the damage to six hospitals and a health office. The type of damage varied. One hospital was under four feet of water, mud and debris. Most of the equipment had been destroyed; some buildings needed extensive repairs. The police was running another hospital with some support from Australia. There was no water service. The health office had come under eight feet of water and the buildings needed major repair. The main general finding of the survey was that most of the facilities were suitable for occupancy after clean up and repair.

Ms Chandrika Sharma of the International Cooperative in Support of Fishworkers (ICSF) presented a list of rehabilitation priorities "from a small-scale fisheries perspective" on the basis of ICSF studies in Indonesia, Sri Lanka, Thailand and India. Some of these priorities:

- A broad coastal development approach should be adopted to improve the quality of life of coastal communities.
- Mechanisms should be set up to maintain and assess public utilities provided by donors and NGOs as part of tsunami relief. Transparent mechanisms should be set up to register complaints about the quality of tsunami rehabilitation assistance. Coordination mechanisms should be strengthened.
- Issues hindering completion of permanent housing should be resolved. If communities relocate, the rights to vacated lands should remain with them. Housing sites for fishery-dependent communities should be located at a convenient distance from areas where they store fishing equipment, access fishing grounds or dry fish.
- Coastal habitats and biodiversity should be protected and restored, and these should not be confined to tsunami-affected areas.
- Further construction of small-scale vessels must be undertaken only after clear evidence of a shortfall in replacing vessels in a particular region.
- Only fishing gear that's appropriate and selective and compatible with the status of fishery resources should be distributed under tsunami rehabilitation.
- Brackishwater aquaculture and mariculture should be promoted as employment alternatives in tsunami-affected areas only after addressing environmental and sustainability concerns.
- Systems for effective registration of craft, gear and engines should be established to streamline post-tsunami rehabilitation. Participatory programmes should be taken up to strengthen management regimes to conserve fishery resources.
- Fishers should be imparted training in basic safety in accordance with revised FAO/IMO/ILO guidelines.

A tsunami memorial in Sri Lanka

- Post-harvest programmes should promote labour-intensive low-cost and locally appropriate technologies. Any cold chains ought to benefit and not displace small-scale processors and traders.
- Vessel and crew insurance should be made mandatory at affordable premia.
- A periodic census of men and women engaged in fishing should be undertaken to facilitate remedial action during natural calamities.
- Women engaged in fisheries operations should be recognised as workers in their own right. Tsunami rehabilitation programmes should aim at improving women's livelihoods, work conditions, resource access and social security.

Group discussions followed the two presentation sessions. A sampling of comments and viewpoints:

- In Sri Lanka, resource assessment for marine fish stocks is being planned in co-operation with Norway. Right now fishers who go deep-sea fishing run into problems with their boats.
- In Tamil Nadu, the heavy rains during the monsoon of 2005 aggravated the problems of tsunami rehabilitation.
- The National Bank for Agriculture and Rural Development (NABARD) has extended loans to fishermen at a very low rate of 4.5 percent. It is imperative that these loans get repaid, so that banks can extend loans to others in need. Where fisheries infrastructure is being created, a fee should be collected from fishermen who benefit.
- More boats do not automatically mean over-exploitation, because they also lead to crew shortage, and the boats may lie idle. Boat registration is a problem in small-scale fisheries. Non-registration hampers proper damage assessment.
- On regulations for boat construction Mr Ari Gudmundsson said that the FAO has helped with fishing craft technology in three countries. But small-scale craft are being built here on the basis of price rather than standards. Regulations for FRP construction are not being followed. Mr Mats Rosander-Liew said regulations for boat construction in Sweden are accepted and followed. But a lot of work was done before regulations came to be accepted.
- For FRP boats in Sri Lanka skilled labour is unavailable. Regulations for construction and equipment exist only on paper. Training and skill upgradation of workers is needed.
- In the Maldives, the government is engaging to some extent in vessel construction as well (besides financial and technical support) as part of tsunami rehabilitation effort.
- Database formats should be locality-specific or at least region-specific. Simple procedures of data collection should be designed, since cost is a factor. Data was not available when tsunami relief work started. Now that it has been created, there are issues of ownership and access. Data should be decentralized.
- Information sharing on calamities is vital not merely within countries but between countries as well.

Workshop participants made a field trip to a fishing village in Mahabalipuram

The workshop participants then divided themselves into three groups to discuss three aspects of tsunami rehabilitation. Each group presented its findings.

Group 1 (fishing boat construction norms and guidelines):

The issue of FRP boat construction was discussed at length. The group made a field trip to a landing center nearby and observed many FRP boats anchored at the beach. It was suggested that the FAO's guidelines for FRP boat construction and repair in the Maldives be disseminated online, so that India and other countries could use them. The FAO can strengthen the process of dissemination if funds are made available.

Just as vehicles must conform to certain standards before they are considered roadworthy, boats must not take to the water or go beyond a certain range unless they are seaworthy.

In Sri Lanka, the NGO Secretariat of the Department of Fisheries meets every month, and would be the right forum for field progress on this subject. Some NGOs are buying back defective boats. It was pointed out that fewer accidents would take place at sea if vacant space in boats was not filled with foam.

In Tamil Nadu, concern has been expressed by many about the quality of boats constructed and distributed after the tsunami. It was suggested that the tsunami reconstruction center in Tamil Nadu – which coordinates with NGOs, some of which are active in remote areas as well – should get across the vital message of seaworthiness. So should the Department of Fisheries.

Group II dealt with fishing capacity. Some of the suggestions made:

Fishers should include spare fuel in their boats, learn how to carry out basic repairs for simple accidents at sea, use appropriate fishing gear, develop a proper life jacket (manufacturers could make life jackets on the basis of what fishermen wanted), clean the boat after every operation.

Group III dealt with policies and regulations. It discussed three issues – strengthening the information base, regulating fishing capacity, and improving the disaster preparedness of fishing communities.

Group members agreed on the paucity of the right data. Sometimes it is available but not accessible. Information needs to be developed on fisheries resources, fishing craft, infrastructure and stakeholders. A time frame must be set for collection and compilation of data. Information access should be streamlined as well, and a mechanism for information sharing on a regional basis worked out.

On regulation of fishing capacity, a clear picture on resource availability must be obtained, particularly in coastal waters. But as a precautionary approach, access to small-scale fisheries must be regulated right away, with the participation of fishermen. Fishing capacity must be frozen at the present level.

On community disaster preparedness, a reliable early-warning system against storms and cyclones is vital. So are education and training of fishers on disaster preparedness. Various options for communication equipment at sea were discussed, and a proper cost-benefit analysis was suggested. Low-cost waterproof mobile phones could be very useful, they could be used to communicate with other fishermen as well, but the Maldives representative said these are not reliable. He advocated VHF sets which can reach fishermen in the deep sea.

Dr V S Sadamate, Advisor (Agriculture), Planning Commission, Government of India, congratulated the organisers of the Tsunami workshop. The Planning Commission would look closely at the conclusions of the workshop and IFISH 3, which concluded a couple of days earlier, he said. The 11th Five-Year Plan will commerce soon, and inputs from these two events will help the Government.

Mr Ari Gudmandsson said the tsunami must have been one of the most debated topics of 2005. It had grabbed global attention in a way that had never happened in recent memory. The Mahabalipuram workshop took up issues not discussed in detail at other workshops, and had therefore proved useful. Dr Yadava hailed the inputs generated at the workshop, which he described as most rewarding.

Post-tsunami Revival of Fisheries Sector and Rehabilitation of Fishing Communities
6 - 7 February 2006, Mahabalipuram, Chennai, India

Participants at the Tsunami workshop

International Instruments on the Safety of Fishing Vessels and Fishermen*

Ari Gudmundsson,
Fishery Industry Officer (Vessels), FAO, Rome

The question of safety of fishing vessels has engaged the FAO since its inception in 1945. The FAO has cooperated with the ILO and the IMO in developing safety standards.

FAO estimates that the global fishing fleet currently consists of some 1.3 million decked vessels and 2.8 million undecked vessels. Of the latter, 65 percent are not fitted with mechanical propulsion systems. Figures 1 and 2 show the distribution of powered decked- and undecked fishing vessels by continent. As for undecked/non-motorised vessels, Asia accounts for about 83 percent of them.

According to FAO records, some 36 million people are employed in primary capture fisheries and aquaculture. This figure includes full-time, part-time and occasional workers. Some 15 million people work full-time in marine fisheries.

Figure 3 shows the distribution of fishermen by continent. About two-thirds of these fishermen work on board fishing vessels of less than 12 metres in length, both decked and undecked.

Commercial fishing is the most dangerous occupation in the world, with more than 24 000 fatalities every year. Enhancing the health and safety of fishermen is one of the main challenges for international organisations dealing with the issue. One way of addressing the challenge is to establish principles for international safety agreements and other legal instruments and to provide guidance for their formulation and implementation.

Fig. 1 Distribution of decked fishing vessels by continent in 1998

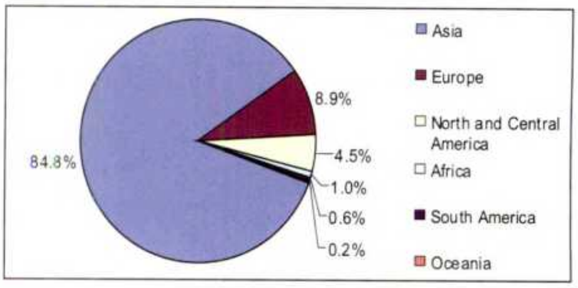


Fig. 2 Distribution of undecked fishing vessels by continent in 1998

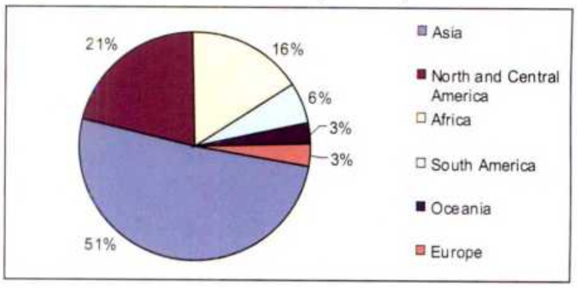
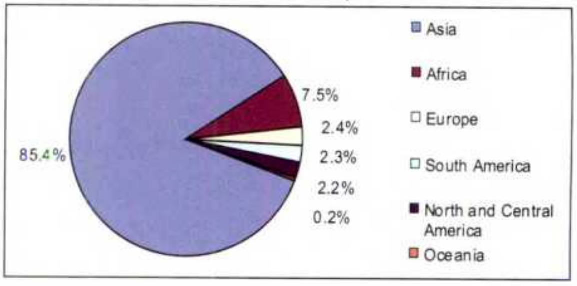


Fig. 3 Distribution of fishermen by continent in 1998



International standards for fishing vessels and fishermen.

International safety standards for fishing vessels already in place are:

- **The 1993 Torremolinos Protocol** relates to the Torremolinos International Convention for the Safety of Fishing Vessels (1977). The Protocol applies to decked fishing vessels of 24 metres in length and over, but certain chapters do not apply to vessels of less than 45 m in length. To apply uniform standards to all vessels, the following regional standards have been developed and communicated to IMO:
- **The FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels, 2005**. The Code is divided into two parts. Part A deals with safety and health practices and applies to all fishing vessels. Part B addresses safety and health requirements for the construction and equipment of fishing vessels and applies to decked fishing vessels of 24 m in length and over.
- **The FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels, 2005**. The Guidelines apply to decked fishing vessels of 12 m in length and over but less than 24 m in length.

International standards relating to the safety of fishermen are:

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* *This article is based on the keynote presentation made by Mr Ari Gudmundsson at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, Chennai, 1-4 February 2006. It outlines the history of international safety standards, describes their current status and how they are being implemented. The article draws extensively on the websites of the FAO, the ILO and the IMO.*

Wooden boats under construction in India

- **International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (STCW-F), 1995.** This Convention applies to crews of seagoing fishing vessels generally of 24 m in length and above.
- **FAO/ILO/IMO Document for Guidance on Training and Certification of Fishing Vessel Personnel**, published on behalf of the three organisations by IMO in 2001.

ILO conventions and recommendations that relate specifically to the fishing sector include:

- Hours of Work (Fishing) Recommendation, 1920 (No. 7).
- Minimum Age (Fishermen) Convention, 1959 (No. 112).
- Medical Examination (Fishermen) Convention, 1959 (No. 113).
- Fishermen's Articles of Agreement Convention, 1959 (No. 114).
- Fishermen's Competency Certificates Convention, 1966 (No. 125).
- Accommodation of Crews (Fishermen) Convention, 1966 (No. 126).
- Vocational Training (Fishermen) Recommendation, 1966 (No. 126).

None of the above-mentioned conventions, *i.e.*– the 1993 Torremolinos Protocol, the 1995 STCW-F Convention and the ILO Conventions – have yet entered into force.

The 1960s – the first steps.

The first attempt to address the safety of fishing vessels and fishermen at an international level was made in the early 1960s. International instruments on the issue did not exist and the principal maritime convention in place needed to be updated.

In 1960, shortly after the creation of the IMO, a conference was held in order to adopt a new International Convention for the Safety of Life at Sea, known as SOLAS. This Convention is generally regarded as the most important of all international treaties concerning maritime safety.

At the 1960 SOLAS Conference, it was proposed that the SOLAS 60 Convention should apply to fishing vessels in addition to merchant ships; however this proposal was eventually dropped. The reason cited was insufficient information on fishing vessels. But the need for international guidance and standards on the safety of fishermen and fishing vessels was recognised, and the Conference asked governments to give the IMO their opinion on extending the provisions of the SOLAS Convention to fishing vessels.

In 1963, the first IMO resolution concerning safety of fishing vessels was adopted by the IMO Assembly. It dealt with "Intact stability of fishing vessels." The Assembly decided that IMO should continue its studies on the stability of fishing vessels "with all possible speed."

Establishment of the Sub-Committee on Safety of Fishing Vessels.

After this resolution, it was decided to form a Panel of Experts on Stability of Fishing Vessels within the Sub-Committee on Stability. In 1964, this panel became a separate Sub-Committee on Safety of Fishing Vessels. The Sub-Committee prepared multiple recommendations concerning the safety of fishing vessels and fishermen, as well as the draft text of the 1977 Torremolinos Convention.

IMO Assembly resolutions concerning the safety of fishing vessels and fishermen during the 1960s and the 1970s.

During the 1960s and 1970s, the IMO Assembly adopted several resolutions prepared by the Sub-Committee on Safety of Fishing Vessels. Most of their content became the basis of the FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels as well as the Torremolinos Convention. These resolutions included:

September 1965: "Intact stability of fishing vessels".

October 1967: "Recommendation on pilot ladders on fishing vessels and vessels of less than 500 Tons Gross".

November 1968:
"Recommendation on Intact Stability of Fishing Vessels".

October 1971: "Recommendation for an Interim Simplified Stability Criterion for Decked Fishing Vessels under 30 m in Length".

October 1971: "Recommendation on Construction of Fishing Vessels Affecting the Vessel's Stability and Crew Safety".

November 1973: "Code of Practice concerning the Accuracy of Stability Information for Fishing Vessels".

Cooperation between FAO, ILO and IMO.

The October 1963 resolution marked the beginning of IMO's work on safety of fishing vessels and fishermen. Less than a year earlier, the Committee on Conditions of Work in the Fishing Industry convened by the ILO had recommended a practical international code dealing with navigational, operational and occupational aspects of safety of fishing vessels and fishermen. The ILO was urged to examine the possibility of establishing a suitable body to prepare such a code, in collaboration with FAO and the IMO.

The three organisations subsequently entered into an agreement relating to fishing vessels and fishermen. FAO would deal with fisheries in general; ILO with labour in fishing industries; and IMO with safety of life, vessels and equipment at sea.

Following this agreement, draft contributions to the Code of Safety for Fishermen and Fishing Vessels were prepared by FAO, ILO and IMO. It was agreed that the Code should be divided into two parts – Part A, to be addressed to skippers and crews, and Part B, to be addressed to shipbuilders and owners.

Code of Safety of Fishermen and Fishing Vessels (Part A, 1968; Part B, 1974).

The contributions of the three organisations to Part A of the Code were consolidated into a single draft at a 1968 meeting at IMO Headquarters in London. The final text of Part A of the Code of Safety for Fishermen and Fishing Vessels was adopted by a joint FAO/ILO/IMO Meeting of Consultants on Safety on Board Fishing Vessels held later the same year.

After Part A was adopted, Part B was prepared by the IMO Sub-Committee on Safety of Fishing Vessels in co-operation with FAO and the ILO. The final text was agreed upon at the second joint FAO/ILO/IMO Meeting of Consultants on Safety on Board Fishing Vessels in 1974.

The purpose of Part B of the Code was to provide information on design, construction and equipment of new decked fishing vessels of 24 m in length and above. It dealt with stability requirements for fishing vessels as well as hull and equipment; machinery and electrical installations; fire protection; protection of the crew; life-saving appliances; radiotelegraphy and radiotelephony etc.

FRP boatyard in Kakinada, Andhra Pradesh

The Torremolinos International Convention for the Safety of Fishing Vessels, 1977.

The 1977 Torremolinos Convention was adopted at a conference held in Torremolinos, Spain from 7 March to 2 April 1977.

In the 1980s, it became clear, mainly because of technical difficulties, that the Torremolinos Convention was unlikely to enter into force. The IMO decided to prepare a replacement in the form of a Protocol.

FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels.

The International Conference on Safety of Fishing Vessels (1977), conscious that the vast majority of fishing vessels throughout the world were less than 24 m in length, urged the IMO to develop safety standards for the design, construction and equipment of such fishing vessels.

The FAO/ILO/IMO Voluntary Guidelines were approved by the Maritime Safety Committee in October 1979 and by FAO in November 1979 for circulation to governments.

Some observers pointed out, however, that parts of the Guidelines were in need of further development. These mainly concerned stability criteria. The International Conference on Safety of Fishing Vessels (1977) adopted a resolution recommending that the IMO continue studies with the aim of formulating detailed stability standards for fishing vessels.

A new generation tuna fishing vessel in the Maldives

October 1989 – Resolution on Safety of Fishermen at Sea – setting the tone for the 1990s.

In 1989 (12 years after the adoption of the Torremolinos Convention) the IMO Assembly adopted a resolution on the safety of fishermen at sea. Through the resolution, the Assembly urged the Maritime Safety Committee to consider and approve a protocol to the Torremolinos Convention. The resolution also dealt with casualty statistics for fishing vessels and fishermen and the training and certification of crews on fishing vessels, two issues that the Assembly had requested the IMO to address.

A working group finalised the draft text of the Protocol in June 1992 for consideration by the Conference the following year.

The 1993 Torremolinos Protocol.

The 1993 Torremolinos Protocol was adopted at a conference held in Torremolinos, Spain, from 22 March to 2 April 1993, exactly 16 years after the adoption of the Torremolinos Convention.

The Protocol applies to fishing vessels of 24 m in length and over, including vessels that process their catch. Safety provisions addressed by the Protocol (contained in a 10-chapter annex) include improved life-saving appliances, satellite communication systems and other components of the global maritime distress and safety system (GMDSS). The Protocol updates the 1977 Convention, taking into account technological evolutions of the intervening years.

Regional standards.

To ensure uniform standards, the Protocol encourages governments to establish uniform standards for fishing vessels operating in the same region. Such regional agreements currently in operation include:

- Guidelines for the safety of fishing vessels of 24 m and over but less than 45 m in length operating in the East and South-East Asia region, adopted at a conference in Tokyo in February 1997.
- European regional agreement applicable from 1 January 1999. It introduced a harmonised safety regime for fishing vessels of 24 m in length. Adopted in December 1997, it is based entirely upon the 1993 Torremolinos Protocol.

Entry-into-force criteria of the 1993 Torremolinos Protocol and the 1995 STCW-F Convention.

The Torremolinos Protocol will enter into force one year after 15 States with at an aggregate fleet of at least 14 000 vessels (in 1993 deemed to be approximately 50 percent of the world's fishing fleet of vessels of 24 m in length and over) ratify the Protocol. Currently only 12 States, with approximately 10 percent of the world's tonnage, have ratified it.

The STCW-F Convention will enter into force one year after 15 States have ratified the Convention. Currently only six States, representing approximately 3 percent of the world's tonnage, have ratified it.

Resolution on the entry-into-force and implementation of instruments.

Concern has been expressed by some States that since the adoption of the 1993 Torremolinos Protocol and the 1995 STCW-F Convention only a few States have ratified these instruments. At the 22nd IMO Assembly, held in November 2001, the opinion was expressed that IMO should become more proactive about the safety of fishing vessels and fishermen given that 24 000 fishermen's lives are lost at sea every year.

On 29 November 2001, the Assembly adopted Resolution A.925(22), "Entry into force and implementation of the 1993 Torremolinos Protocol and the 1995 STCW-F Convention".

This resolution urges Governments to consider accepting the 1993 Torremolinos Protocol and the 1995 STCW-F Convention at the earliest possible opportunity.

Regional seminars on the implementation of the 1993 Torremolinos Protocol and the STCW-F Convention.

Implementation of the Torremolinos Protocol: the first seminar was held in Beijing, China in September 2004.

Implementation of the STCW-F Convention: the first seminar was held in Busan, Republic of Korea, December 2002.

A new initiative to bring the 1993 Torremolinos Protocol into force.

In 2004, the IMO took a new initiative to bring the 1993 Torremolinos Protocol into force. The Secretary-General of IMO invited member governments to provide the IMO with information on the number of fishing vessels of 24 m in length and over flying their flags and to enumerate their reasons for not ratifying the Protocol. Forty-two IMO member states responded to the request. Among the reasons for their reluctance to ratify the Protocol provided by the IMO Member States as well as FAO were the following:

- exposure of fishing vessels to port State control is a major factor;
- the entry-into-force of the Protocol entails a large administrative and financial burden;
- a significant change in fishermen's attitudes is needed for a change in fishing vessel safety;
- ratification and subsequent implementation of the Protocol would place a financial burden on the industry, which some States believe they could not shoulder; this problem cannot be solved by the IMO alone, so it should consider contacting other relevant UN organisations;
- some States believe that the safety of their fishing vessel fleets is already adequately covered by national regulations; and
- some States do not have the legislative authority to inspect and certify fishing vessels flying their flags.

Other international instruments on the safety of fishing vessels and fishermen.

The other international instruments on the safety of fishing vessels and fishermen that are already in place are:

- SOLAS 74. Chapter V of the Convention applies to fishing vessels. It is, however, up to flag state governments to determine to what extent the provisions of certain regulations of that chapter shall not apply. These regulations contain, *inter alia*, requirements on ship-borne navigational equipment.
- The Convention on the International Regulations for Preventing Collisions at Sea (1972, COLREGs). This Convention applies to all vessels, including fishing vessels, operating on the high seas and all waters connected to the high seas and navigable by seagoing vessels.
- FAO/ILO/IMO Document for Guidance on Training and Certification of Fishing Vessel Personnel is the first international maritime training guide for fishermen. This document was prepared by a joint FAO/ILO/IMO working group and published by IMO in 1985. It covered training and certification of small-scale and industrial fishermen. A revised document, entitled Document for Guidance on Training and Certification of Fishing Vessel Personnel, was approved by FAO, ILO and IMO in 2000.

The Code of Conduct for Responsible Fisheries and the role of FAO.

The 1995 FAO Code of Conduct for Responsible Fisheries provides a framework for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with the environment. A part of the Code addresses safety and health in the fishing sector, in particular the following three articles:

6.17: States should ensure that fishing facilities and equipment as well as all fisheries activities allow for safe, healthy and fair working and living conditions and meet internationally agreed standards adopted by relevant international organisations.

8.1.5: States should ensure that health and safety standards are adopted for everyone employed in fishing operations. Such standards should be not less than the minimum requirements of relevant international agreements on conditions of work and service.

8.2.5: Flag States should ensure compliance with appropriate safety requirements for fishing vessels and fishers in accordance with international conventions, internationally agreed codes of practice and voluntary guidelines. States should adopt appropriate safety requirements for all small vessels not covered by such international conventions, codes of practice or voluntary guidelines.

The 2000s - Development of new international safety standards for small fishing vessels.

Currently, there are no international safety standards in place for decked fishing vessels of less than 12 m in length and undecked fishing vessels of any size. Standards need to be developed, as the large majority of fishing fatalities occur aboard precisely such vessels. In December 2004, the IMO Maritime Safety Committee (MSC) agreed to include in the work programme of its Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety a new high priority item dealing with 'Safety of small fishing vessels,' with a target completion date of 2009. FAO intends to participate actively in the development of these new standards.

Needed: Political Will.

Commercial fishing is one of the most dangerous occupations in the world. Enhancing health and safety in the fishing industry is a major challenge for international organisations dealing with the issue. One way of addressing the matter is to establish principles and to provide guidance which may be used to formulate and implement international agreements and other legal instruments. But ultimately the instruments need to be implemented and enforced, and this is mainly the responsibility of governments. It is a task that calls for political will and commitment.

Role of Indian Coast Guard in Search and Rescue of Fishers at Sea*

Prabhakaran Paleri, *Director-General, Coast Guard, New Delhi*

The Coast Guard was set up only in 1978. But an umbilical chord already seems to bind the Coast Guard and the marine fisheries community.

The Coast Guard has multiple responsibilities, and strengthening the safety of fishers is only one of them. It needs to develop its capabilities in this respect.

Fishers are vulnerable to disasters of several kinds – accidents, casualties, abductions, alien interventions. The fisher community must ensure that its vessels meet safety requirements and are able to provide essential information in times of disaster. The Indian Coast Guard cannot assist fishers exclusively, but concern for fishers is central to its aims.

The Indian Coast Guard was formally inaugurated on 18 Aug 1978 as an independent armed force of the Indian Union, through an act of Parliament. It is the fourth armed force under the Ministry of Defence – the first three being the Army, the Navy and the Air Force. It has a specific charter for non-military security; but it addresses issues related to national defence. Its motto is Vayam Rakshamah ("We protect").

The world's coast guards normally deal with marine safety, maritime security, life saving, law enforcement, marine environmental security and fisheries. These call for monitoring, control, surveillance and response (MCSR) at sea. Coast Guards all over the maritime world are country-specific, and to that extent asymmetrical in their duties and functions, though they have some common traits.

The Indian Coast Guard too has its exclusive characteristics. The Coast Guard's duties and functions, as spelled out in the Coast Guard Act, 1978, include:

- safety and protection of islands and offshore structures;
- protection and preservation of maritime environment and endangered species;
- prevention and control of pollution in the maritime zones;
- assistance to the Customs in anti-smuggling operations;
- assistance to fishermen in distress at sea;
- safeguarding life and property at sea;
- preventing poaching in Indian waters;
- assisting in ocean research-related activities;
- enforcing maritime law;
- carrying out other duties as assigned by the Government of India without duplication of effort.

The Coast Guard is led by a Director-General, from headquarters in New Delhi. It has three regional commands at Mumbai, Chennai and Port Blair, and 11 district commands – one in each coastal State, two in the Andaman and Nicobar Islands.

Thus the Coast Guard is a multi-mission public service provider with short-term as well as long-term strategic goals. Most of its duties are relevant either directly or indirectly to fishers and their livelihoods. But it can be deployed for law and treaty enforcement, as well as for humanitarian, diplomatic, environmental and military goals.

The strategic role of the Coast Guard is to protect the maritime zones from illegal activities including infiltration through maritime routes, and environmental damage, and provide humanitarian and scientific assistance within the maritime domain.

Mission Statements of the Indian Coast Guard

The "mission statements" of the Coast Guard, which derive from its Charter and its functions, are:

1. Offshore security
2. Marine environmental security
3. Maritime zone security
4. Marine safety
5. Scientific assistance
6. National defence

To carry out its missions, the Coast Guard needs sufficient forces, personnel, expertise, authority, infrastructure and enforcement-friendly laws.

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* *This article is based on a presentation made by Dr Prabhakaran Paleri at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, Chennai, 1-4 February 2006.*

Maritime Search and Rescue

Maritime search and rescue entails searching for persons, ships or other craft that are feared to be in distress or imminent danger, and rescuing or helping them. It is one of the operational tasks covered under the mission statement "marine safety." The mission statement reads:

"Prevent death, injuries, fatalities and property loss associated with maritime activities at sea, and reach out to those in distress and traumatic situations at all times in all weather conditions and ensure safety and security from natural or human induced disaster."

The Coast Guard has prepared a National Maritime Search and Rescue Manual. The Coast Guard is the coordinating authority in a mission of search and rescue which is terrain-specific, not victim-specific. The terrain comprises a whopping 4.6 million sq km in the maritime domain around India. The mission is carried out with the help of three maritime rescue coordination centres (MRCC) based at Mumbai, Chennai and Port Blair. There are also rescue sub-centres functioning from Coast Guard district headquarters at Porbandar, Marmagoa, New Mangalore, Kochi, Vishakhapatnam, Paradeep, Haldia, Diglipur and Campbell Bay. These centres function round the clock.

Communication for search and rescue is provided through fixed communication networks such as GMDSS (global maritime distress safety system), ATS (air traffic services) channels, DSC (digital selective calling) and through INMARSAT (the international maritime satellite earth station);.

The Coast Guard has been operating the ship reporting system INDSAR (Indian M-SAR computerised ship reporting system) since 1 February 2003. It is a voluntary toll-free reporting system that will assist the MRCCs to divert the most suitable ship to the scene of distress, and also keep track of a ship that is overdue or may need urgent assistance. Participation in INDSAR is voluntary and free of cost.

A search operation in progress

In addition to INDSAR, the Coast Guard plans to introduce ISLEREP, a system that may allow communication with ships within 25 miles of island territories. It is a VHF radio network system and seeks to provide additional navigational safety for ships as they pass through or close to the islands.

The Indian Coast Guard and Marine Fishers.

The relationship of the Coast Guard with the fisheries community is defined by the mission statements.

- Offshore security: Fishers who stray into high-security offshore exploration areas will face problems and subsequent loss of catch.
- Marine environmental security: relates to the effects of pollution on fisheries resources and subsequent loss of fish catch. It also relates to the interaction of fishers with marine ecosystems.
- Maritime zone security: relates to law enforcement. Fishers could be direct or indirect victims, or participants.
- Marine safety: covers the entire spectrum of safety of life and property at sea. Fishers are a community that will require protection and assistance.

Bringing a fishing boat to safety

- Scientific assistance: to provide scientific support to ocean research activities including fisheries research.

Different types of fishers operate in territorial and close-to-territorial waters. A few of them are slowly venturing into deeper waters. Safety is the paramount objective for a fisher at sea. Record books of the Indian Coast Guard show that the problems experienced by fishers with respect to safety at sea are:

(a) Individual vessel distress
  - Accident-breakdown, capsizing, sinking, collision.
  - Cross border incident-accidents, seizures, attacks.
  - Navigational errors.
  - Pirate attacks.
  - Abductions.
  - Tribal attacks.
  - Medical problems.

(b) Mass distress
  - Cyclones.
  - Tsunami.
  - Seizures and attacks in alien waters.
  - Internal clashes.

Each of these situations has to be handled separately. Action takes varied forms.

Violations of the law by fishers can't be ruled out. They have been involved in illegal fishing across borders, clashes, pirate attacks on merchant ships, smuggling, trafficking, etc.

The Indian Coast Guard has conducted 935 search and rescue missions since its inception. It has saved 3 549 lives at sea, including those of 914 fishers, through 590 missions. There have been 368 incidents of alien firing at Indian fishers since 1983. 100 fishers were killed and 365 injured in the alien attacks recorded so far. This is besides random apprehensions of Indian fishers by bordering states while fishing across international boundaries.

Interaction with the Fisheries Community.

The Coast Guard introduced community interaction programmes in August 1999 specifically to interact with coastal communities including fishers. These programmes have been only partially successful, because of the limitations imposed on the Coast Guard by other mandated duties. The interaction with fishers aims at inducing safety awareness among them, warning them when weather conditions deteriorate, making friendly contacts related to public safety, and providing distress relief services including medical relief. These programmes have been appreciated by the community in various coastal states and islands.

Patrolling the high seas

Conclusion

Though the Coast Guard has been able to strike a chord with the fisheries community on safety matters, much more needs to be done. Fishers in India are either traditional or follow a traditional safety mindset even when they operate larger vessels. Mechanisation ensures speed through engines or outboard motors in place of traditional oars which necessitated longer stay at sea, thereby increasing the probability of distress. But on other aspects of safety – inspection of vessels, communication equipment, weather information through radio, life saving appliances, safety training, organised search and rescue efforts, coordination with the Coast Guard – awareness and action are low. A more proactive approach to safety by the Coast Guard, by fisheries administrations and by fisher communities will improve safety at sea.

To sum up, the Coast Guard plays a definite role in safety of life and property of fishers in India. The limitations lie in the disorganised state of fishers in India with respect to safety – low awareness, poor compliance with safety procedures – and also in the modest personnel size of the Indian Coast Guard relative to the tasks. But the Coast Guard has the will and determination to effectively carry out its missions, including that of enhancing the safety of fishers.

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Sea safety programmes for small-scale and commercial fishermen in Sri Lanka*

G Piyasena, *Director-General, Department of Fisheries and Aquatic Resources, Sri Lanka*

Marine fisheries is socially and economically significant around the entire 1 770 km coastline of Sri Lanka. The Exclusive Economic Zone of the country extends to 517 000 km^2, of which some 2 800 km^2 form the continental shelf. The marine area from the shore to the edge of the continental shelf is the coastal sub-sector. Annual sustainable yields from the coastal sub-sector have been estimated at 250 000 metric tonnes (mt) (170 000 mt of pelagic species and 80 000 mt of demersal species).

Some 610 species of coastal fish have been reported in Sri Lanka. The more common species caught are ***Sardinella sp., Amyblygaster sp., Rastrelliger sp, Auxis thazard, Anchova commersoni and Hirundichthys coromandelensis.*** Most of these species live near the surface of the water. These small pelagics account for about 40 percent of the coastal fish production. Species such as ***Lethrinus sp.,Trichurus sp., Caranx sp***., species of skates and rays, ***Cynoglossus sp***. and ***Jojnius*** *and* ***Tolithus sp***. live at the bottom of the coastal region (demersal). Many species of fish live between the surface and the bottom.

Some 90 species of oceanic pelagic varieties of fish have been reported to live in Sri Lankan offshore and deep sea waters. ***Katsuwonus pelamis*** and ***Thunnus albacares*** dominate the large pelagic catches. These are migratory fish species and are therefore classified as stocks shared with other countries. Moreover, some 60 species of sharks and about 215 demersal fin and shellfish species have been reported in oceanic waters around Sri Lanka. The commercially important larger species are ***L. lentjan, L. nebulosis*** *and* ***Lutjanus sp., Pristipomoids sp.*** *and* ***Epinephelus sp.***

Production trends.

Total fish production in 2004 increased marginally by 0.5 percent over the previous year (Table 1). Marine fish production accounted for nearly 90 percent of the total fish catch, of which the coastal fish catch was 60 percent. The actual coastal fish production in 2004 was 154 470 mt, and actual offshore production 98 720 mt.

Generally, some 285 000 tonnes of fish are landed annually; 90 percent of it is consumed locally, the remaining 10 percent is exported. The export of fish and fishery products in 2004 was 13 680 mt, valued at Rs. 9 435 million (US $ 94.3 million), while imports of fish products (mostly dried and canned supplies) amounted to 67 284 mt at a cost of Rs. 5 944 million (US $ 59.4 million).

Fishing activities take place around the entire coast of the country. Landings prior to the tsunami were made at 12 fishery harbours, several large and small anchorages and as many as 700 village-level landing sites.

Marine fish production has recorded a ten-fold increase since 1950, thanks to various development programmes carried out by the government. Marine sector fish production data is collected and analysed on the basis of 15 fisheries districts. Figure 1 summarises details by district.

Safety and health of fishers receive inadequate attention

This article is based on the presentation made by Mr G Piyasena in the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, 1-4 February 2006.

Profile of the artisanal, small-scale, commercial fishing sectors and the fishing fleet.

The marine fishing fleet consists mainly of small to medium size craft, owned and operated by private individuals. The total fishing fleet in 2004 consisted of 31 663 boats (Table 2) and diverse types of traditional and large-scale fishing crafts. The broader categorisation of fishing crafts is as follows:

Type of craft	Length
Non-motorized traditional craft	up to 21 feet
Motorized traditional craft	up to 45 feet
FRP day boats with OBM	17 - 23 feet
3½ ton day boats	28 - 32 feet
Offshore multi-day boats	34 - 60 feet
Beach seine craft	up to 30 feet

Prior to the tsunami, most traditional fishermen landed their fish catch at the estimated 700 village-level landing sites at beaches. Some landed in river creeks (estimated at 150). Multi-day boats and some of the day boats used the 12 fishery harbours, most of which were established in the 1970s. Major landing sites are located in the districts most affected by the tsunami.

Fish landed at fishery harbours, anchorages and fish landing centres is either transported to major urban centres such as Colombo, Kandy or Galle or sold locally. Fish retailing is done through municipal fish markets in urban centres, through private sector fish stalls and fish retailing outlets, or through motorcycle and bicycle vendors. Over the last few years, fish sections in supermarkets have become very popular among urban consumers.

Colombo has the main wholesale fish market in the island, St. John's Fish Market. Fish received is either sold to retailers, institutional buyers, caterers or consumers, and redirected to various parts of the island.

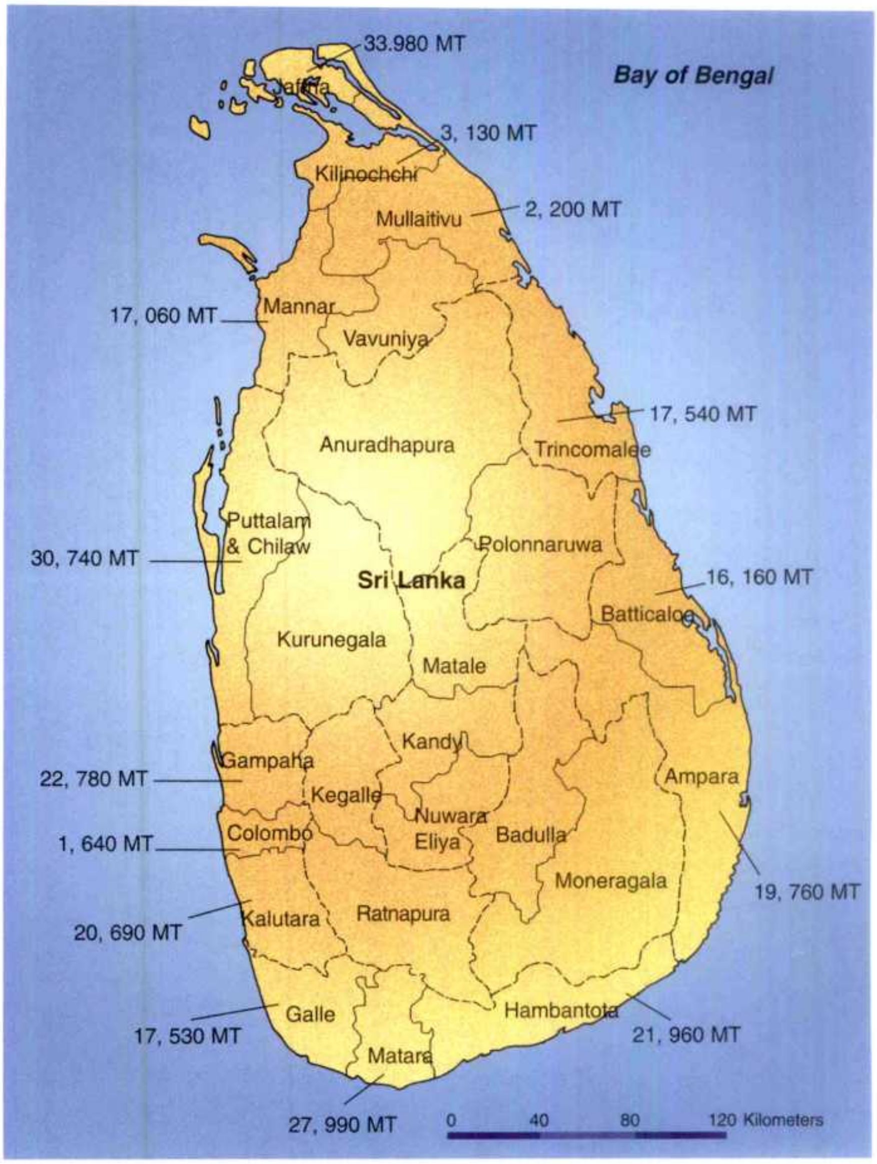
33.980 MT
Bay of Bengal
Jaffna
3, 130 MT
Kilinochchi
Mullaitivu
2, 200 MT
17, 060 MT
Mannar
Vavuniya
17, 540 MT
Anuradhapura
Trincomalee
Puttalam & Chilaw
30, 740 MT
Polonnaruwa
Sri Lanka
16, 160 MT
Batticaloa
Kurunegala
Matale
Kandy
Gampaha
22, 780 MT
Ampara
Kegalle
Nuwara Eliya
Badulla
1, 640 MT
Colombo
Moneragala
19, 760 MT
Kalutara
Ratnapura
20, 690 MT
Galle
Hambantota
17, 530 MT
21, 960 MT
Matara
27, 990 MT
0
40
80
120 Kilometers

Figure 1: District-wise marine fish landings in Sri Lanka

Marine fisheries supports several associated industries and activities such as:

- manufacture of boats, nets and gear;
- fish processing, value addition, transport and marketing;
- production of ice; and
- curing / drying of fish.

Impact of the tsunami on the fishing fleet.

The Sri Lankan coast was heavily impacted by the tsunami of

Table 1: Annual fish production in Sri Lanka (*in metric tonnes*)

Year	Marine Fish Catch		Total Marine Catch	Inland and Aquaculture	Total Fish Catch
	Coastal	Offshore			
1950	-	-	25 124	-	25 124
1980	165 264	2 148	167 412	20 266	187 678
1985	140 270	2 400	142 670	32 740	175 410
1990	134 130	11 670	145 800	38 190	183 990
1995	157 500	60 000	217 500	18 250	235 750
2000	175 280	84 400	259 680	36 700	296 380
2001	167 530	87 360	254 890	29 870	284 760
2002	176 250	98 510	274 760	28 130	302 890
2003	163 850	90 830	254 680	30 280	284 960
2004	154 470	98 720	253 190	33 180	286 370

December 26 2004. Table 3 shows the damage caused by the tsunami and the status of recovery of the fishing fleet as at the end of December 2005.

Traditional fishing has been done inshore using simple canoes with outriggers. Despite development efforts spanning over 50 years, this type of boat still makes up nearly half of the fleet. Some 2 percent of fishing boats are canoes powered by outboard motors; a further 3 percent are beach seine craft without motors. Large motorised 'day boats' were introduced in the mid-1950s and consist of two types of crafts: 17-23 ft flat-bottomed fiberglass reinforced plastic boats (FRP) with outboard motors (37%) and 3.5 ton/ 28 ft FRP motorised boats (5%). In the 1980s, 59 ft motorised multi-day boats were introduced (5%).

Table 2 indicates trends in the development of the country's marine fishing fleet during the last five years.

Table 2: Marine fishing fleet in Sri Lanka (2000 - 2004)

Boat type	**2000**	**2001**	**2002**	**2003**	**2004**
Offshore multi-day boats	1430	1572	1614	1530	1581
3 1/2 ton day boats (28 ft)	1470	993	1029	1486	1493
6-7m FRP boats (17-21 ft)	8690	8744	9033	11020	11559
Motorized traditional crafts	1404	639	776	618	674
Non-motorized traditional crafts	15109	15000	15600	15040	15260
Beach seine crafts	900	900	900	953	1096
Total	**29003**	**27848**	**28952**	**30647**	**31663**

76 percent of the total fishing fleet was affected by the tsunami. But 94 percent of the damaged fleet was either repaired or replaced within a year of the tsunami (by December 2005).

Sea safety issues

Sri Lankan fishers, both small-scale and commercial, have learned through long years of experience to fish almost round the year facing a number of major sea current systems and monsoons – northeast (November-January) and southwest (May-August). Fortunately, only a few lives and vessels are lost due to these sea conditions.

However, the number of multi-day boats drifting in the open sea due to engine failure, navigational difficulties, rudder damage and fuel shortage remains high. Boat manufacturers have improved the construction of boats in terms of construction materials, the size and shape of the hull and deck layout, but the attention paid to internationally accepted safety standards and construction norms is inadequate. Necessary action is therefore being taken to introduce new legal provisions concerning the safety of fishing vessels, to ensure required fishing facilities, equipment and health, and fair working and living conditions.

The following are the main factors behind accidents in small-scale fisheries in Sri Lanka:

- Inadequate knowledge of safety measures
- Lack of safety equipment
- Inadequate maintenance of crafts
- Engine failures
- Unfavourable weather conditions
- Insufficient fuel capacity
- Construction defects

Multi-day boats generally encounter the following problems:

- Drifting to foreign seas
- Inadequacies concerning seaworthiness of boats
- Inadequate knowledge on navigational equipment & reading navigational charts
- Engine failure
- Insufficient communication & naval equipment
- Lack of awareness of legal requirements on distant fishing cruises
- Unfavourable weather conditions

The major issue at present is the increasing number of incidents of drifting of multi-day boats at sea. Not enough care is taken to ensure the seaworthiness of multi-day boats. Some of them are recovered by air and sea surveillance or rescued by larger ocean-going vessels sailing through the same area or by coast guard vessels of neighbouring countries. Several cases of loss of life are reported when a boat is detected at sea and rescued or found after drifting to other states. It is imperative to ensure that the design of the craft is appropriate for the voyages and the sea conditions.

Traditional canoes dominate the coastal waters

Table 3: Fishing fleet recovery status (end December 2005)

Boat Type	2004 fleet	Damaged	Destroyed	Repaired	Replaced
Multi-day	1581	676	187	780	0
One day	1493	783	276	904	29
FRP boats	11559	3211	4480	4258	4321
Traditional crafts	15934	2435	11158	3479	8636

There are nearly 30 boatyards in Sri Lanka, of which 14 are capable of constructing multi-day boats. Other boat yards produce FRP day boats and traditional crafts. Existing regulations are inadequate to control construction quality and ensure the safety of the boat and crew.

International guidelines and safety standards laid down by various agreements and protocols such as the 1993 Torremolinos Protocol, the 2005 FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels and the FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels, etc. have not been incorporated into local legislation so far. However, the Ministry of Fisheries and Aquatic Resources has taken action to introduce new regulations under the Fisheries and Aquatic Resources Act in collaboration with the FAO and the Government of Italy.

Multi-day boats at the anchorage

Recommendations

In order to ensure that the sea safety standards are incorporated in the construction of boats and safety of crew, the following steps have to be taken.

- Strengthen the law and introduce international safety standards in boat construction in line with FAO/ILO/IMO Voluntary Guidelines both for small fishing vessels and commercial fishing vessels.
- Tighten legal provisions concerning the safety of fishing vessel crews in line with FAO/ILO/IMO guidelines to ensure the compulsory use of sufficient communication & navigation equipment.
- Raise awareness among multi-day fishers about:
  - Legal requirements concerning sea cruises.
  - Operating equipment & reading charts.
  - FAO/ILO/IMO Code of Safety for Fishermen & Vessels.
  - Strengthen surveillance and rescue operations.
- Improve and regularise weather forecasts so that fishers are better aware of them and can regularly receive them.

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Post-tsunami revival of fisheries sector and rehabilitation of fishing communities in Tamil Nadu*

D P Yadav, *Director, Department of Fisheries, Tamil Nadu, India*

The Tamil Nadu Director of Fisheries made a comprehensive presentation on the havoc wrought by the tsunami in Tamil Nadu and the way the Department of Fisheries met the challenges of relief and rehabilitation.

Next to Andaman-Nicobar islands, Tamil Nadu, with its 1 076 km coastline, was the state worst hit by the tsunami. Nearly 420 fishing hamlets in all the 13 coastal districts of the state were affected, about 8 000 persons lost their lives and more than 55 000 homes were destroyed (Figure 1). Fishing and related activities ground to a halt. The initial assessment of damage caused to fishing implements is given in Table 1.

The fishing infrastructure – fishing harbours, jetties and fish landing centers – sustained damage worth Rs 650 million. The bar mouths of rivers were totally closed at many places.

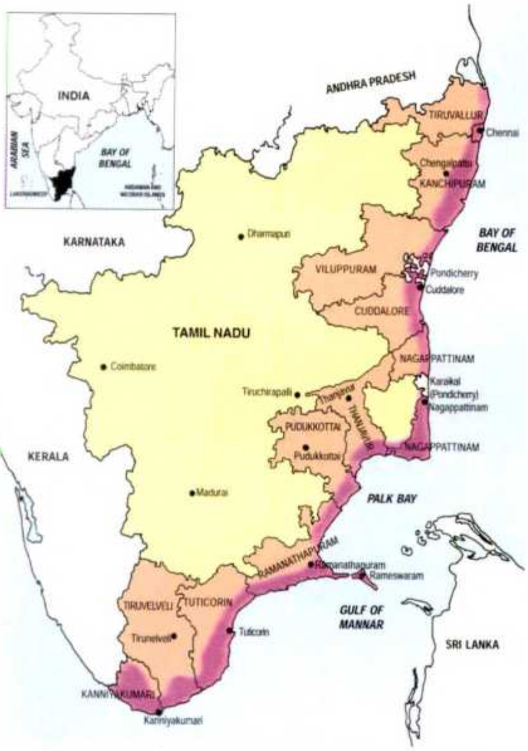
INDIA
ARABIAN SEA
BAY OF BENGAL
ANDHRA PRADESH
KARNATAKA
KERALA
TAMIL NADU
TIRUVALLUR
Chennai
Chengalpattu
KANCHIPURAM
BAY OF BENGAL
Dharmapuri
VILUPPURAM
Pondicherry
Cuddalore
CUDDALORE
Coimbatore
NAGAPPATTINAM
Karaikal (Pondicherry)
Nagappattinam
Tiruchirapalli
Thanjavur
THANJAVUR
PUDUKKOTTAI
Pudukkottai
NAGAPPATTINAM
Madurai
PALK BAY
RAMANATHAPURAM
Ramanathapuram
Rameswaram
TIRUVELVELI
TUTICORIN
Tuticorin
Tirunelveli
GULF OF MANNAR
SRI LANKA
KANNIYAKUMARI
Kanniyakumari

Figure 1: Map of Tamil Nadu showing the affected coastal areas

Government relief measures

The Government of Tamil Nadu responded with alacrity to the tragedy, and came up with an action plan. The District administrations immediately mounted search, rescue, evacuation, relief and infrastructure-restoration work. The immediate relief packages provided by the government included:

- Rs. 4 000, 60 kg of rice, a dhoti-saree set, two bedsheets and three litres of kerosene to those whose houses had been damaged. This relief assistance was extended to more than 118 000 families.
- Rs. 2 000, 60 kg of rice, a dhoti-saree set, two bedsheets and three litres of kerosene were distributed to those who had lost their livelihoods. Nearly 176 500 families were covered.
- Temporary shelters for fishers who had lost their homes.
- An ex-gratia payment of Rs.100 000 per deceased person from the Chief Minister's Public Relief Fund.
- A special package for fisheries to repair and replace fishing equipment damaged by the tsunami. Fishers who lost wooden catamarans and nets were fully compensated. As regards FRP boats and vallams: those who suffered partial losses were compensated in full.

Table 2 summarizes relief packages announced by the government to repair and replace fishing crafts and gear.

Long-term measures

To facilitate long-term recovery, the government obtained assistance from the World Bank (US $ 423 million), the ADB (US $ 143.75 million) and IFAD (US $ 30 million). Besides, a UNDP project aims at restoring livelihoods, upgrading infrastructure, and providing policy support.

Under a rehabilitation phase, the government plans to construct nearly 90 000 permanent houses across the State, at a cost of Rs 150 000 each. The houses will be constructed in a modern environment with access to roads, street lights, drinking water supply, community hall, etc.

In the fisheries sector, four fishing harbours will be reconstructed and modernised. Permanent openings will be provided at four river bar mouths to help fishermen venturing

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* *This article is based on a presentation made by Mr D P Yadav in the Workshop on Post-Tsunami Revival of Fisheries Sector and Rehabilitation of Fishing Communities, Mahabalipuram, 6-7 February 2006.*

Table 1: Initial assessment of damage to fisheries sector in Tamil Nadu, India

Districts	Catamarans		Vallams		Mechanised fishing boats		Nets (metric tonnes)	Engines
	Partly damaged	Fully damaged	Partly damaged	Fully damaged	Partly damaged	Fully damaged		
Chennai	1 300	1 085	4	13	520	570	116.9	313
Kancheepuram	145	2 622	0	135	0	0	73.53	0
Thiruvallur	0	2 880	0	19	0	8	88.00	0
Villupuram	0	3 248	0	27	0	29	504.35	0
Cuddalore	565	3 700	78	668	361	364	548.31	580
Thiruvarur	7	0	12	0	0	0	6.54	3
Thanjavur	47	0	232	0	127	127	52.10	17
Nagapattinam	341	6 582	239	4 405	353	983	576.85	341
Pudukottai	192	89	402	188	59	59	35.32	19
Ramanatha Puram	0	0	260	2	9	10	0.31	0
Thoothukudi	666	3	698	1	0	0	77.85	63
Tirunelveli	620	767	196	254	0	0	50.36	134
Kanniyakumari	264	10 407	857	2 428	346	505	69.65	90
Total	**4 147**	**31383**	**2 978**	**8 140**	**1 775**	**2 655**	**2 200.07**	**1 560**

out to sea. Fishing harbours and jetties will be repaired, river channels will be dredged. A sum of Rs. 50 million has been provided for a communication network for fishermen venturing out to sea from Tamil Nadu. A sum of Rs. 650 million has been provided for restoring and upgrading the fishery infrastructure.

The government has undertaken to restore the Cuddalore and Nagapattinam sea ports. Mangrove forests and sand dunes serve as natural barriers against natural disasters. Shelterbelt plantations are therefore planned in all the 13 coastal districts of Tamil Nadu.

The government has drawn up a comprehensive plan to develop coastal areas with such initiatives as strengthening connectivity in coastal areas, constructing link roads and bridges, increasing disaster preparedness and human resource development through training.

Role of NGOs and the private sector.

An outpouring of relief from everywhere led to problems of organisation and co-ordination.

A fishing port in Tamil Nadu - back to work

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NGO co-ordination centres were therefore set up in all the affected districts. The outcome was a great partnership between NGOs, corporates and the Government.

NGOs and corporates constructed some 18 000 temporary shelters and over 32 000 permanent shelters. They donated a substantial number of FRP fishing crafts, engines and nets to fishermen. Some 4 000 FRP crafts were supplied to fishermen in Tamil Nadu.

Many corporates have set up desalination plants to provide drinking water to the affected communities. A few corporates and NGOs have come forward to construct fish markets and fish auction halls. Another initiative of great significance is the setting up of village knowledge centres in tsunami-affected areas.

Policy interventions to restore the livelihoods of fisher communities.

1. Advance warning systems to be developed and established by the Central Government.
2. Tamil Nadu government to provide fishers with a communication network. It will enable them to send out distress calls, and hear advance weather warnings.
3. Policy decision: no house will be reconstructed within 200 metres of the High Tide Line (HTL) in the Coastal Regulation Zone (CRZ). New houses will be located beyond 200 meters of the HTL. Families will get insurance coverage for 10 years.
4. Shelterbelt plantations across the coast of Tamil Nadu to be set up to protect coastal communities from future natural calamities.
5. The government will encourage conversion of all traditional wooden catamarans into FRP catamarans through a 50 percent subsidy subject to a maximum of Rs.75 000. Low-interest bank loans will be available for the remainder.
6. Better roads and connecting bridges will improve connectivity with coastal areas.
7. A major impetus has been given for the development and modernisation of the fishery infrastructure in Tamil Nadu.
8. Coastal communities will be trained in alternative livelihood options.
9. The World Bank has proposed to establish a fund of US $ 2.5 million to study policy issues relating to fisheries in Tamil Nadu and Pondicherry.
10. Diversification of the coastal economy. As a first step, a sum of approximately Rs. 280 million has been received under a centrally sponsored scheme to promote mariculture activities – such as the culture of finfish, mussel and oyster, seaweeds, ornamental fish, crab and lobster fattening. Fisherfolk will be trained in post-harvest operations and in value addition.

Key Issues to be Addressed.

The Tamil Nadu government proposes to address some key issues through the following implementations.

1. **Initiate co-management of coastal resources.**
2. **Enhance the capacity of the Department of Fisheries.** In particular, the regulatory role of the Department of Fisheries must be improved. Currently, almost 90 percent of the Department's effort goes into welfare. Development must become the pre-eminent role. This requires substantial investment in machinery, equipment and manpower, and a new emphasis on human resource development.
3. **Diversification of coastal economy** by promoting budget tourism, eco-tourism, watersports, leisure tourism and industrialisation. Culture fishery must be stimulated. Private initiatives are needed to develop cold chains and value addition centres in coastal areas.
4. **Development of domestic fisheries market**. This includes development of on-line auctioning of fish, and access of fishing hamlets to market intelligence so that they market fish profitably.

Said Mr Yadav: "We have gone far in the journey to a better future, but there's still a long way to go."

Table 2: Relief package for repair/ replacement of fishing craft, gear and equipment

Details	Partly damaged craft	Fully damaged
Catamarans Wooden / FRP	Rs. 10 000 or the assessed damage value, which ever is lower.	Rs. 32 000/- (inclusive of Net)
Vallam Wooden / FRP	Rs. 15 000 or the assessed damage value, which ever is lower.	Rs. 75 000/- as subsidy and Rs. 75 000 as loan (inclusive of engine & net)
Mechanised Boat	60% of the damage value as subsidy subject to a maximum of Rs. 300 000 and remaining 40% of the damaged value as loan.	35% of the current replacement value of the craft as subsidy subject to maximum of Rs. 500 000 and the remaining 65% of the replacement value as bank loan.
Engines	Repair / Replacement Rs. 5 000/-	
Nets	For catamarans – Rs. 10 000/- For vallams – Rs. 20 000/-	

CONSRN meets to review the rehabilitation of fisheries sector in tsunami-affected countries in Asia

The FAO Regional Office for Asia and the Pacific (RAP) in collaboration with the Consortium to Restore Shattered Livelihoods in Tsunami-Devastated Nations (CONSRN) organised a two-day Regional Workshop in Bangkok, Thailand from 30 to 31 March 2006 to re-assess needs and help coordinate the long-term rehabilitation that is now needed in the affected countries. The partners of CONSRN are APFIC, BOBP-IGO, FAO, NACA, SEAFDEC and WorldFish Centre.

CONSRN had first met earlier (28 February – 01 March 2005) and finalised the Regional Strategic Framework (RSF) for assisting the tsunami-affected countries (*Bay of Bengal News*, September 2005, pp. 8-10).

The goals and objectives of this second Workshop were to review the progress against the regional strategy, review and discuss national strategies and plan how CONSRN/ donors can further assist the affected countries.

Forty participants representing the seven tsunami –affected countries (India, Indonesia, Maldives, Malaysia, Myanmar, Sri Lanka, Thailand), representatives of donor agencies, Inter-Governmental Agency/ Association, NGOs, CONSRN partners, FAO Chief Technical Officers and Consultants, and FAO technical staff attended the two-day Workshop. Dr Y S Yadava, Director, and Dr S S Tabrez Nasar, Senior Programme Officer, represented BOBP-IGO in the Workshop.

Presiding over the opening session of the Workshop, Dr He Changchui, FAO Assistant Director-General and Regional Representative for Asia and the Pacific said "Turning crisis into opportunities, the 2004 tsunami has raised awareness of and mobilized world solidarity for poverty in coastal areas – a topic previously not high on the international agenda". "In restoring the livelihoods of coastal communities, we must ensure sustainable development of the fisheries and aquaculture sectors and sound management of the natural resource base such as land, coral reefs, mangrove forests and associated fisheries".

Representatives of the seven tsunami–affected countries made detailed presentations on the status of the relief and rehabilitation work carried out in their countries. The relief work was almost over in most of the tsunami-affected countries and the focus was now on rehabilitation. These presentations included detailed assessments of damage to the fisheries sector and its impact on the communities and the national economies, rehabilitation strategies and the achievements so far, fund mobilization from donors and internal sources, gaps and constraints, the challenges ahead and the long-term strategies to build back better. The representatives also outlined the mechanisms set up for implementing long-term rehabilitation programmes in their countries, which included constitution of high-level Ministerial Committees, Core Groups and Task Forces.

The Workshop expressed concern on things that went wrong in the process of rehabilitation such as excess quantity of boats and fishing gear supplied by governments and donors, poor quality of boats in many areas, perceived inequities in distribution of fishery and aquaculture inputs and

Participants at the CONSRN Workshop

lack of consideration of other important aspects such as post-harvest and markets. Many boats were not sea-worthy, and this raised the issue of safety of fishermen at sea. Concern was also expressed on the slow process of rehabilitation in some countries and the lack of evaluation of the asset distribution done so far. The participants felt the need to shift from simple asset replacement to programmes that serve the needs of the whole community with focus on vulnerable groups such as women and the elderly.

The Workshop discussed critical outstanding issues and possible solutions against the RSF agreed to by CONSRN consortium partners and governments from affected countries. The RSF included improving policy and institutions, providing appropriate physical assets, restoring the environment while ensuring equitable access, providing appropriate financial support, improving capacity in support of community livelihoods, and responsible coastal resource management, and the rebuilding of social assets.

The Workshop participants, divided into three working groups, brainstormed the outstanding issues under the six strategic elements of the RSF and each country presented the top five issues in the plenary session. These issues broadly included development of infrastructure facilities with focus on post-harvest collection and supply chain, improvements in the database and sharing of information, formulation and implementation of management plans, capacity building, establishment of early warning systems, scientific studies on post-tsunami environmental changes, mobilization of funds for ensuring long-term rehabilitation and better coordination between agencies engaged in the rehabilitation works.

The primary output of the Workshop will be a report which will include a review of progress towards achieving the goals set out in the RSF, a summary of country strategies and recommendations for future work for CONSRN partners.

CONSRN and post-tsunami rehabilitation activities

CONSRN members have been actively assisting the governments and the fisher-communities of tsunami-affected countries in the rehabilitation process. A large number of interventions have been undertaken, many of them successfully completed. Here's a sampling of the activities of CONSRN members:

BOBP-IGO www.bobpigo.org

Organised a Stakeholder Consultation in June 2005 to discuss the rehabilitation programmes for fisher communities in Tamil Nadu and Pondicherry, India.

Conducted a detailed damage and needs assessment of tsunami-affected fisher-communities in Tamil Nadu, India.

Organised the Third International Conference on Fishing Industry Safety and Health (IFISH 3) in association with FAO and NIOSH, USA, and a Regional Workshop to discuss the Post-tsunami Revival of Fisheries Sector and Rehabilitation of Fishing Communities.

FAO www.fao.org

Assisting governments efforts to re-establish sustainable fisheries activities, rehabilitate affected / damaged areas and restore fisheries-based livelihoods.

Helping fishing communities to resume their livelihoods through distribution of fishing gear and boat engines. Assisting in construction of boats and development of suitable designs to meet local needs.

Providing technical experts to help the tsunami-affected countries in rebuilding their fisheries and aquaculture sectors.

NACA www.enaca.org

Participated in technical assessments of the damage to the fisheries and aquaculture sectors in both Thailand and Indonesia.

Established a *Special Program in Response to Impacts of the Tsunami* (SPIRIT) as a vehicle to focus the Network's contribution to the recovery. The first SPIRIT activities have got underway with initiation of field projects in several island communities in southern Thailand and in Aceh, Indonesia.

Awarded a 2-year contract by ADB to manage a project aimed at rehabilitating the aquaculture and fisheries sector of Aceh.

Assisting the FAO Emergency Coordination Unit in Colombo to organise and implement livelihoods analysis activities with communities in the tsunami affected districts of Hambantota, Ampara and Batticaloa.

SEAFDEC www.seafdec.org

Conducted a National Workshop on Tsunami Rehabilitation in Phuket in February 2005 in collaboration with CHARM.

Conducted an Informal Regional Consultation on SEAFDEC Support to Fisheries Relief Program for the Tsunami -Affected Countries of ASEAN in April 2005. Formulated the ASEAN-SEAFDEC Strategies on Rehabilitation of Fisheries of Coastal Community for the Tsunami Affected Areas.

Worldfish Center www.worldfishcenter.org

Introduced and developed models for GO-NGO cooperation in fisheries and aquaculture.

Conducted studies on coral reefs, which included collation of assessment data; guidelines for monitoring impact assessment in Myanmar and Langkawi.

Developed two series of policy briefs in association with CONSRN to assist rehabilitation efforts.

Fisheries Cooperative Societies of Sri Lanka discuss fisheries business and resource management

The International Cooperative Fisheries Organization (ICFO) of the International Cooperative Alliance (ICA) and the Sri Lanka National Federation of Fishing Cooperative Societies Ltd. organised a four-day (20 – 23 March 2006) seminar on "Development of Fisheries Cooperative Societies in Sri Lanka in relation to Fisheries Business and Resources Management". The seminar was held in Negombo, Sri Lanka.

Eighty-seven delegates took part. They represented 40 fisheries cooperative societies; the Ministry of Fisheries and Aquatic Resources and the Department of Cooperative Development, Government of Sri Lanka; and fisheries experts from Sri Lanka and abroad. Dr Y S Yadava, Director, BOBP-IGO participated as a resource person.

Mr Felix Perera, Minister of Fisheries and Aquatic Resources, Sri Lanka, in his inaugural address said that the fisheries sector contributes immensely to the Sri Lankan economy. It is the main source of income of about 200 000 people living in 2 637 fishing villages in the

International Cooperative Alliance

Founded in 1895, the International Cooperative Alliance (ICA) has 222 members representing national and international cooperative organisations in all sectors of activity including agriculture, banking, fisheries, health, housing, industry, insurance, tourism and consumer cooperatives. These represent approximately 800 million individuals worldwide. ICA's activities focus on promoting and defending the cooperative identity, raising awareness about cooperatives, ensuring that the right policy environment exists to enable cooperatives to grow and prosper, providing its members with key information, best practices and contacts and providing technical assistance to cooperatives through development programmes. The ICA head office is located in Geneva, Switzerland, with four regional offices at Nairobi, Kenya (for Africa); San Jose, Costa Rica (for the Americas); New Delhi, India (for Asia and the Pacific) and Brussels, Belgium (for Europe). For more details visit www.ica.coop or email ica@ica.coop

International Co-operative Fisheries Organisation (ICFO)

The ICFO is a specialised organisation of the ICA. It was originally founded in 1966, as a sub-committee of the ICA's Agricultural Committee. It became an independent body in 1976. Today, ICFO has 27 member organisations from 23 countries. ICFO objectives include creation of new co-operative fisheries organisations; promotion of co-operative training and education, including the production of educational material; exchange of technical information movements on a global basis; and promotion of trade. The headquarters of ICFO are located in Tokyo, Japan. For more details visit www.ica.coop/icfo or email kokusai-sato@r6.dion.ne.jp country. Another 60 000 people derive their livelihoods from fisheries related industries. Mr Perera said that his Ministry together with the Ministry of Cooperatives has decided to re-organise the fisheries cooperatives in Sri Lanka. Other speakers in the inaugural session included Mr Jude Tissera, President of Sri Lanka National Federation of Fisheries Cooperative Societies; Mr Masaaki Sato, Secretary, ICFO; Mr Hideo Ishida, Senior Official for International Cooperation Division, International Affairs Department, Ministry of Agriculture, Forestry and Fisheries, Government of Japan; and Mr Yasuhiro Watanabe, Second Secretary (Economic Cooperation), Embassy of Japan in Sri Lanka.

The seminar included presentations by 15 experts and group discussions on topics such as coastal environment and fisheries resources management, institutional strengthening, marketing, gender participation, business planning and entrepreneurship development and post-harvest technology. The groups agreed on important recommendations, such as community participation in decision-making processes on resource management; strengthening mechanisms for effective communication between the community and the institutions; modernisation of fish landing centres to reduce post-harvest losses; development of business and business processes etc. Participants visited the Negombo Multi-Purpose Cooperative Society, and the Negombo Fishing Harbour and did boat-rides to see fishing activities in the Negombo lagoon.

Mr H L Tissera, Commissioner of Cooperative Development & Registrar of Cooperative Societies, Sri Lanka, presided over the concluding session. Mr Sato thanked the participants and said the recommendations adopted by the seminar were most useful.

Top: Mr Masaaki Sato (left) and Mr Shanta Bhandara (right)
Below: Group discussion in progress

Welcome
SRI LANKA

BOBP-IGO Regional Workshop to discuss setting up of monitoring, control and surveillance programmes in the member-countries

The contribution of marine fisheries to the national economies of the BOBP-IGO member-countries is significant. Large numbers of small-scale and artisanal fishers are engaged in the sector. For many coastal communities, fishing is the chief source of livelihood. However, with the rapid increase in effort and an open access regime, fishing in coastal areas has become difficult with low catches and fishing rights conflicts. A large proportion of marine fish stocks are fully exploited, over-exploited, depleted or in need of recovery.

The BOBP-IGO member-countries have a strong commitment towards implementation of the Code of Conduct for Responsible Fisheries. The countries have also recognised that reducing fish stocks to biologically and ecologically harmful levels will result in loss of potential benefits as food, income, or employment, both immediate and in the long-term.

To address the above issues, a three-day Regional Workshop on Monitoring, Control and Surveillance (MCS) is proposed to be held in Bangladesh (Chittagong/ Cox's Bazar) during early June 2006. The objective of the Regional Workshop is to develop knowledge to establish an effective and implementable monitoring, control and surveillance regime for management and conservation of the marine fisheries resources in the member-countries. The Workshop participants will include representatives of the Ministries/ Departments of Fisheries, Transport (Mercantile Marine Wings), Coast Guard, Master Fishermen and Experts/ Resource persons from within and outside the region.

The saga of India's salt workers*

The BOBP-IGO recently completed a one-year study of India's salt workers. The study was commissioned by the Salt Commissioner's Office, Government of India and the results were presented at a National Workshop held in Ahmedabad on 17 February 2006. This article provides glimpses into the study.

Salt sustains all life on earth – that of humans, animals, plants. Centuries ago, Roman soldiers were paid their salary in salt. And ancient Greeks used to buy slaves with salt to sustain their sybaritic lifestyle.

Salt has some 14 000 uses in industry. Salt was the unlikely weapon used by Mahatma Gandhi to galvanise India's freedom struggle.

Despite this impressive history and its tremendous everyday utility, "common salt" is usually taken for granted. And salt workers – those who extract this substance from the seas, lakes or the earth – are hardly the heroes of history or mythology, ballad or legend. If anything, they are unsung beasts of burden.

Not many know that salt works begin where civilization ends; that salt pans lie in coastal and desert areas under a pitiless scorching sun; that some 150 000 salt workers in India and their families (perhaps half a million people in all) live for eight months a year in this harsh environment that's often devoid of basic amenities such as drinking water, schools, hospitals or markets; that they do the toughest of manual jobs, risking blindness, blood pressure, skin lesions, knee injury, back pain and exhaustion, and epidemics such as malaria; that most salt worker children are school drop-outs, and are vulnerable to chronic cough and tuberculosis; that despite such living conditions, salt workers are paid low wages, and suffer vile exploitation at the hands of the many intermediaries in the salt business, including money-lenders. Little wonder that they seek to drown their sorrows in alcohol or blow them away with smoke – further aggravating their problems.

Perhaps the cruel landscape of the Little Rann of Kutch in Gujarat best exemplifies the plight of India's salt workers. This area has a lot of underground saline water. Extracting salt from it is a business opportunity tapped by some 1 500 small and large salt pans, mainly in Surendranagar and Patan districts. Some 15 000 families – merchants, *agarias* (salt workers-cum-entrepreneurs) labourers – farm salt here during the September-March season. Many of them live here for eight months, setting up small grass-roofed shacks. Little children grow up playing in salty water under the blazing sun, sometimes helping out their parents in the salt pans with sundry jobs.

The sea and the subsoil brine are the main sources of salt in India. Solar evaporation of brine (from either source) is the main technology for salt production; vacuum evaporation is the mechanisation method used by the industrialised west and by large companies in India. Subsoil brine is tapped mainly in the Rann of Kutch in Gujarat and in parts of Rajasthan. Rocks (found in Himachal Pradesh) and lakes (such as the Sambar lake near Jaipur, Rajasthan) are other sources of salt.

The salt workers of the Little Rann of Kutch make salt by digging wells and evaporation ponds, and

Women in the salt industry bear a heavy burden

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* *This article has been condensed from the BOBP-IGO report on 'Socio-Economic Status of Workers in the Salt Industry' by Mr S R Madhu.*

transferring subsoil brine from the wells to the ponds. This translates into a series of chores that have basically remained unchanged for years. Selection of sites; well-digging; preparation of the land nearby for a series of evaporation ponds; construction of ponds by bunding the land, and setting up channels for movement of brine; hardening and evening out earth on the ponds by trampling it repeatedly with bare feet; use of diesel pumps to flood the evaporation ponds with brine from the wells; use of heavy wooden rakes on the salt bed to obtain large-grain crystals of salt.

These crystals are heaped up in pans, loaded into trucks and transported out. Collection, storage and transport of salt is a highly labour-intensive task. The entire cycle – from well-digging to salt harvesting – takes three or four months.

For marine salt production, sea water is admitted at high tide by sluice gates through creeks or man-made canals to low-level reservoirs or small creeks. The production process is similar to that of inland salt. But salt collection from marine pans is even more tedious than from inland pans. Salt layers are broken up with metal hoes and shoves. Disintegrated salt is collected in small heaps, washed of impurities and loaded into trucks.

Despite their back-breaking work, salt workers at many places lack access to protective gear such as eye goggles or gum boots. Amenities for first aid and for rest and recreation are inadequate, at places non-existent.

Following a spate of reports and complaints on the plight of salt workers, especially in the Rann of Kutch, the Salt Commissioner's Office decided to organise an in-depth study. The BOBP-IGO was assigned the responsibility, in view of the many studies it has carried out on similarly under-privileged fisherfolk communities in countries around the Bay of Bengal.

The BOBP-IGO, conducted a socio-economic survey of salt workers in the major salt-producing states (Rajasthan, Gujarat, Maharashtra, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal) from September 2004 to August 2005. More than a thousand salt workers from the seven states filled up a structured questionnaire; a detailed interaction was carried out with a sampling of salt workers in these states, using the tool of PRA (participatory rural appraisal). Discussions were held with ministries, salt associations and NGOs.

A report and a video film have been prepared on the basis of the study and its conclusions. The report contains useful statistical information. The video film that accompanies the report shows some lively interviews with salt workers.

A few basic facts: Some 120 countries produce salt today. Total salt production is about 210 million tonnes. The USA is the top producer; China ranks second; India, with 17 million tonnes, is third. The salt industry is governed by the Salt Cess Act of 1953, which is implemented through the Salt Commissioner's Office, headquartered in Jaipur. Gujarat accounts for about 70 percent of India's salt production, followed by Tamil Nadu with 14 percent and Rajasthan with 11 percent (Figure 1).

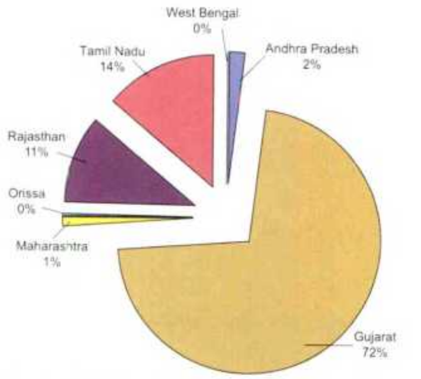


Figure 1: State-wise contribution in salt production in India (2004)

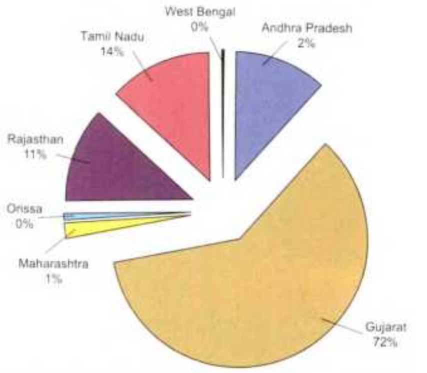


Figure 2: State-wise average daily employment (2004)

Historically speaking, India's salt industry is many centuries old. Its growth was hobbled by the British who imposed heavy taxes on it, forcing import of salt from Britain. It's after independence that domestic salt production was encouraged once more. The industry was de-licensed in 1996. Today, some 2.25 million tonnes of salt is exported annually.

Drawing sub-soil brine in Santhalpur

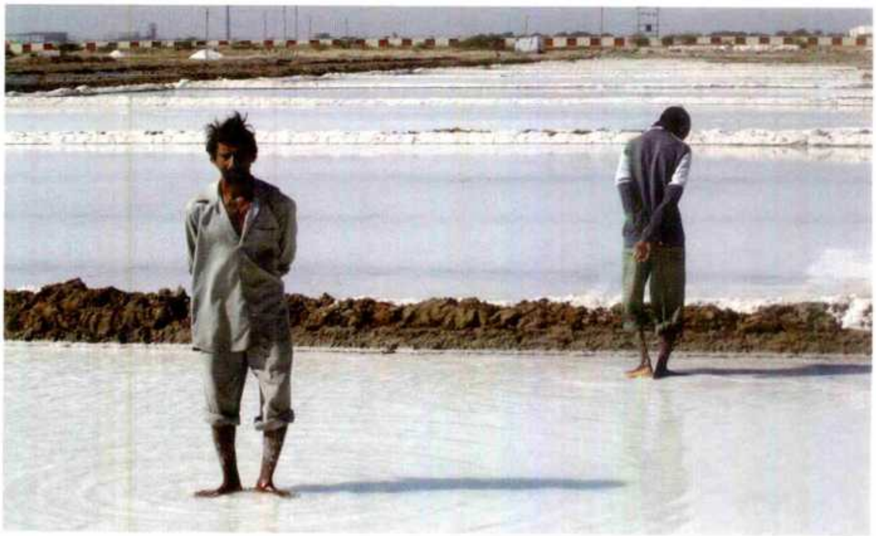
Some 10 347 units in India produce salt. About half a million acres of land have been allocated to salt production, of which 300 000 have been developed. The 10 347 units have been classified into four categories ranging from more than a hundred acres (Category 1) to "unrecognised units" of less than 10 acres (Category IV).

India's salt industry is labour-intensive. It engages some 150 000 workers on an average per day. Gujarat provides the maximum daily employment (Figure 2). Most of them (except a few who are employed by large companies) operate on a no-work-no-pay contract for eight months a year. Several thousands depend indirectly on the salt industry for their income.

There are three kinds of salt workers in India, depending on the type of location and the pattern of entrepreneurship. The worker may be hired by a land leaseholder who owns a salt pan, or by a manager or a labour contractor on behalf of the leaseholder or sub-leased out to the salt worker with a buy-back system.

Salt workers in small salt pans are the worst sufferers. Muthumani of Rajapandinagar village near Tuticorin breaks down as she describes the plight of her 45-year-old husband. He is paralysed and moves about in a wheelchair, because of his work in salt pans. "I have spent a lot of money on his treatment that I can ill-afford, but he has not recovered. We have six daughters. What is to happen to us?"

Says an ***Agaria*** of Patan district in the Rann of Kutch: "Life is very tough, though I was born here. There's no provisions market close by. Essentials for day-to-day living are hardly available. Take drinking water. We have to buy it from a tanker, though I can hardly afford it. Medical facilities, even for first aid, are poor. If we fall ill or get hurt, there's no transport even to take us to the hospital, which is 25 km away. I would like to educate my children, but there's no school here. We can't leave them alone back home, we bring them along to the Rann, they grow up here playing and helping us out in the desert."



Trampling the salt pan

Salt workers in the organised sector are relatively better off. Mr Bharat C Rawal, Deputy General Manager of Solaris, Jamnagar, says "We provide all basic amenities to our workers – such as drinking water, education, health. A teacher lives here. There's a dispensary. Major ailments like TB and night blindness are treated. In the field, we provide workers with eye goggles and gum boots. We take particular care about safety. Electricity is available round the clock. There's a rest shed, a crèche to take care of little children. We provide decent wages. The benefit of provident fund is available even to a person who has worked for just one day. There are insurance schemes."

Mr Rawal suggested that the government could use some of the substantial revenue from big salt producers to help small-scale producers and workers, such as those in the Little Rann of Kutch.

Women workers loading salt in Tuticorin

Salt Commissioner Mr S Sundaresan said in an interview that the industry has made tremendous progress since independence. The importer of the British era is today an exporter. "Workers have problems because salt manufacturing is confined to remote, backward, drought-prone areas. The working environment here is harsh. Further, salt manufacturing is a seasonal activity. Labour is mainly on a contract basis." On the other hand, the salt industry provided succour to thousands who had no other job option.

He said the Central Government has under the Tenth Plan introduced the Namak Mazdoor Awas Yojana, for the construction of 5 000 houses for salt workers. Pilot plants were being planned through Bharat Heavy Electricals to supply potable drinking water, using the reverse osmosis process. Next year, five reverse osmosis plants would be set up in each salt producing state. Mr Sundaresan agrees that "more welfare schemes are needed for salt workers".

A major problem of the salt industry is that of timely transport of harvested salt from Gujarat or Tamil Nadu, the main producing states, to other areas. Tractors and trucks move salt over short distances, Railway wagons over long distances. During the peak salt season, the Railways are unable to provide enough rakes. The freight charges are very high, small producers say. This affects their revenues, and indirectly impacts on the salt workers as well.

Loading of salt in Hindustan Salts Limited, Sambhar, Rajasthan

The BOBP-IGO study team has made a number of recommendations concerning salt workers (box below).

Implementing most of these recommendations would be the best way of recognising and rewarding salt workers for their contribution to the Indian economy.

Recommendations of BOBP-IGO on salt workers:

- Create a data base on salt workers. Undertake a full census. Register all salt workers.
- Guarantee employment, fix minimum wages.
- Improve workplace amenities, such as access to potable drinking water, mobile clinics, protective gear, sanitation, rest sheds. Strengthen awareness on family planning. Recruit health workers from the salt workers' community.
- Set up a group insurance scheme. Improve and widen credit access.
- Set up child crèches and schools. Mobilise NGOs for the purpose.
- Modernise the industry without marginalizing small-scale salt units. Standardise production techniques. Improve power supply. Set up salt parks in select locations.
- Strengthen infrastructure for storage and transport of salt, with jetties, and efficient rail rakes.

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation(BOBP-IGO).The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

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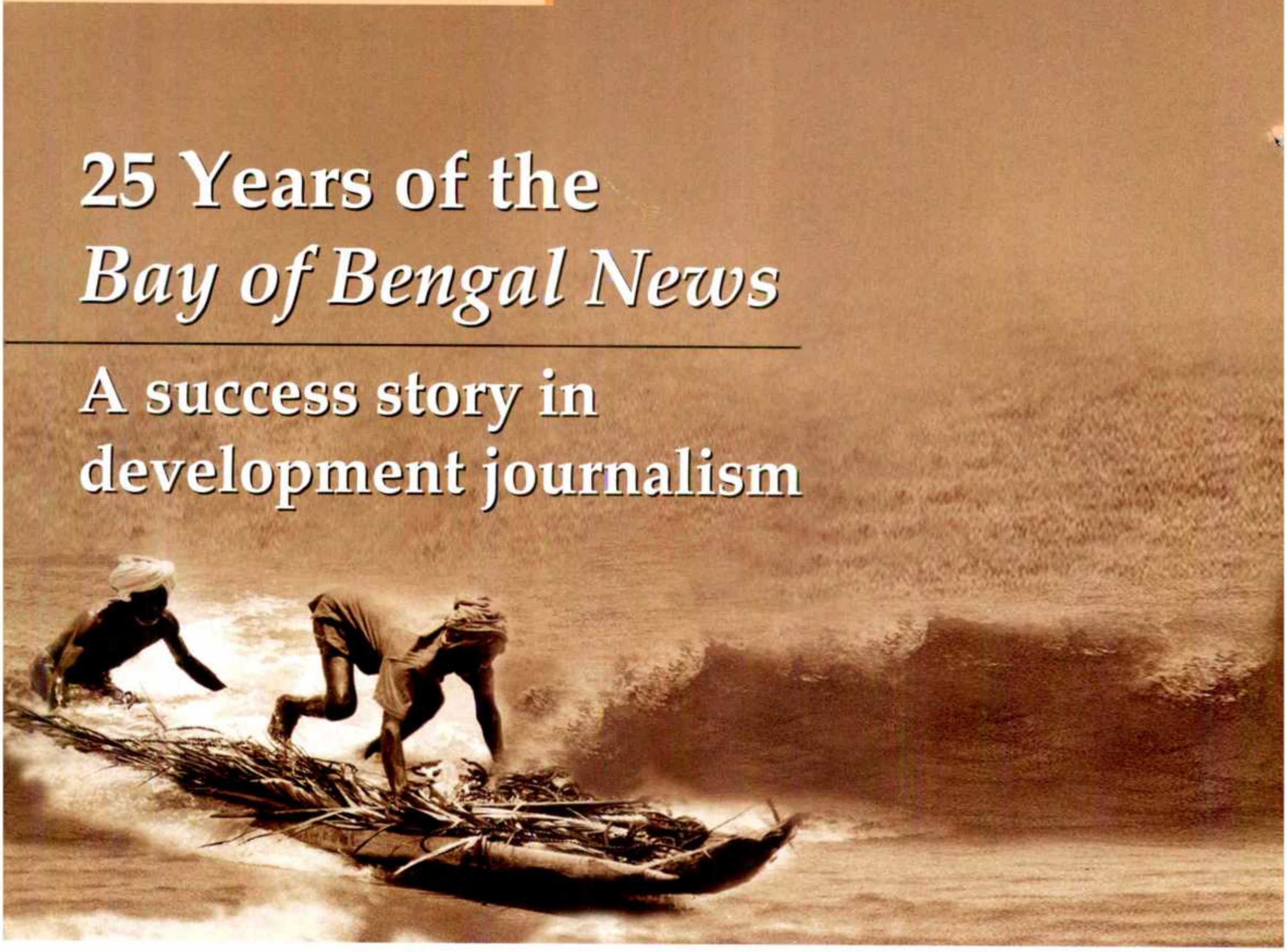
A success story in development journalism



The Bay of Bengal News (BBN) ***has entered upon its 26th year – after 80 issues, about 1 000 articles and several hundred photographs. This issue goes beyond the statistics to recall highlights of a quarter century of a small but power-packed newsletter. We have also recorded the perceptions of some readers about BBN – what it has meant to them, how well it has chronicled the many-faceted multi-disciplinary work of BOBP in helping small-scale fisheries and fisherfolk communities in the Bay of Bengal region.***

I first came across the ***Bay of Bengal News*** during the late 1980s. An article on shrimp fry culture in West Bengal, India, caught my eye. I haven't missed another issue of BBN. It reported and analysed work of the Bay of Bengal Programme – concerning technologies and socio-economics in small-scale fisheries and the lives of fisherfolk communities in seven countries surrounding the Bay. The BBN was always well-researched, concisely and beautifully presented – a pleasure to go through.
I carefully preserved every issue in a leather-bound jacket. Little did I realise that I would one day be the editor-publisher of the BBN.

In 1981, when Bay of Bengal News was born, small-scale fisheries was little-known and little documented. What it did for national economies, food and nutrition security and livelihoods was neither understood nor recognised. Over the years, BBN not only raised the profile of small-scale fisheries but become synonymous with it.

The *Bay of Bengal News* marks a happy blend of professional expertise in both fisheries and journalism. In other fisheries journals, scientists have doubled up as editors. Result: both readability and presentation have suffered.

The inputs that a talented journalist-editor can bring to a technical journal are many. He writes for the reader, something scientists normally don't manage to do. In fact simplicity, clarity and lucidity are the three characteristics of good writing, according to Somerset Maugham, who himself exemplified these three virtues. BBN considers these as essential. And brevity as well. At BBN we try hard to ensure that every word carries weight.

A few thoughts about editors. They have been compared to architects. Both turn out products that must be functional as well as attractive. Both must pay attention to detail. An architect ensures that every brick or tile, every nut or bolt, is in the right place. An editor is fiercely particular too: fonts should be of the right size, shouldn't clash, columns should align, subheads should not be broken between lines. When an article opens with a two-page spread, the heading, sub-head and photograph should reinforce each other with a single message, not put out different messages.

The editor strives for maximum impact with every article. Is the article too dull? What can be done to liven it up? Would a photo essay lend an additional new dimension to the theme? How best can photographs for such an essay be organised? Would an anecdotal box brighten coverage? Can the artist come up with an imaginative illustration?

A professional, creative artist is indispensable for a magazine that takes design seriously. His perceptions of an article's message and meaning may be entirely different from that of others. The editor-artist interactions can lead to wonderfully creative and imaginative ideas for eye-stopping visuals. This is behind the presentation style of ***Bay of Bengal News.*** The BOBP has been enlightened enough to respect professionalism in preparing and presenting information. Its sagacity has been well rewarded.

Should a fisheries magazine focus so much on the minutiae of presentation? The success of ***Bay of Bengal News*** provides the answer.

It is not surprising that ***Bay of Bengal News*** has surpassed the technical reports of BOBP in popularity. Even scientists prefer to read the short, illustrated summaries of technical work that appear in the BBN rather than the more thorough and rigorous scientific reports – at least initially. Very often, of course, they first read the BBN article, then go to the report.

The ***Bay of Bengal News*** was an important dissemination tool of the BOBP. It remains so during the BOBP's IGO ***avatar***. Inter-country co-operation is an important feature of our content today. So is awareness-raising. We frequently bring important publications (of the UN, of international agencies) to the attention of the region. So also important meetings. With the present issue, we begin a series of articles on leading fisheries institutions in the region.

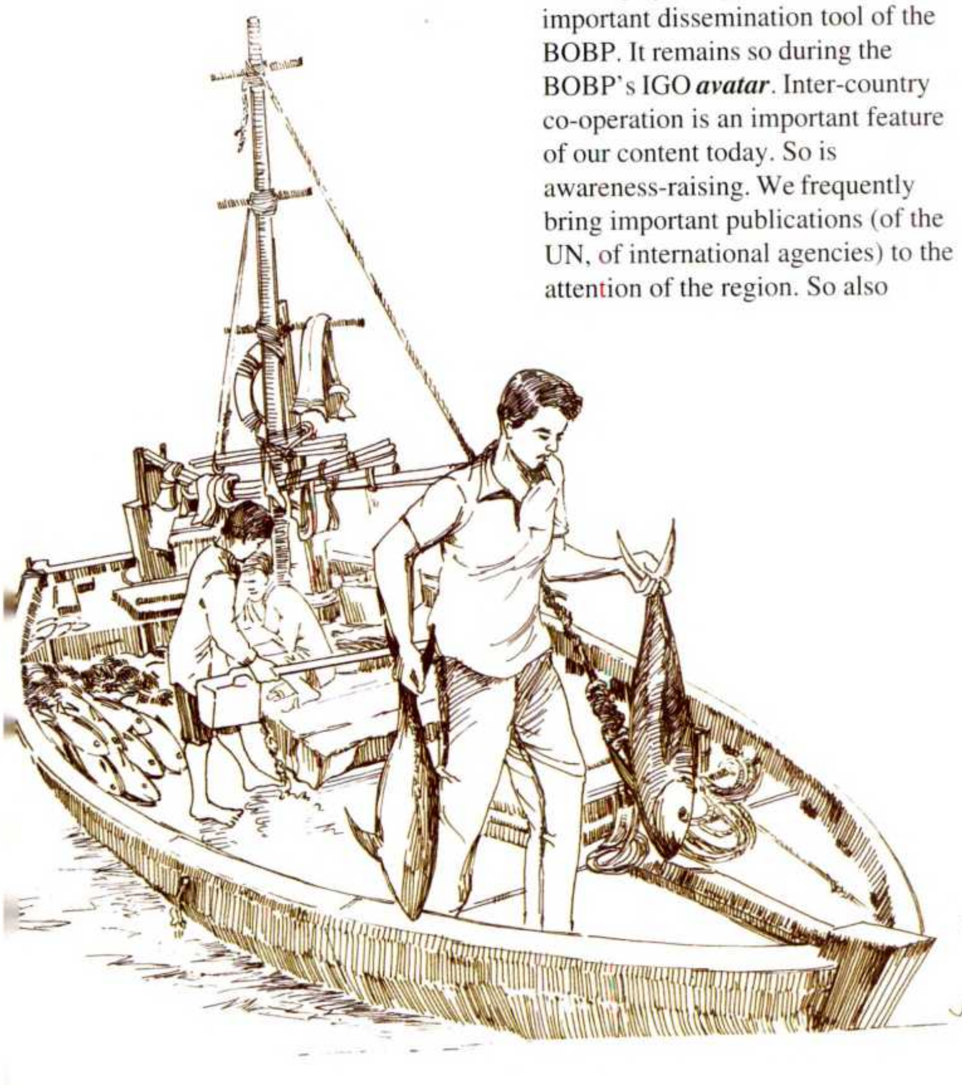
In 2001, the BOBP produced a CD-ROM from the first 71 issues of BBN (1981- 2000). It was an instant hit and continues to be in great demand. We plan to update the CD-ROM with later issues of the BBN. Eventually, our website (www.bobpigo.org) will also contain back and current issues of BBN. This will enable universal access to ***Bay of Bengal News.***

During its two main periods of transition – between the second and third phases, between the third and IGO phase – the BBN was irregular, and a few issues had to be combined. This was unavoidable, with staff and activities having been reduced to a bare minimum. But during these periods, we were snowed under with queries and complaints, a reflection of what BBN meant to readers. With the IGO now having been established on a firm footing, we can promise unerring regularity in publication and periodicity.

Apart from changing subject orientation, BBN has kept pace with technology as well. Today, the pre-press part of newsletter work is done entirely in-house. Our only interaction with the printing press occurs at the very end, when we hand over a CD. This is in striking contrast to the every-day interaction during the first decade of BBN. In future, we plan to reach fisherfolk communities as well, through vernacular editions of the BBN.

The ***Bay of Bengal News*** has been a keen and conscientious chronicler of development – both of BOBP and of small-scale fisheries. It will remain so, and continue to pursue the highest standards of development journalism.

—Y S Yadava



Tuna landings in Malé, Maldives

Bay of Bengal News: Lessons for the Future

by **Arne Andreasson**

A distinguished Swedish fisheries expert analyses the role and relevance of Bay of Bengal News (BBN) for development, as well as the future of the BOBP-IGO as a regional forum.

B*ay of Bengal News* is 25 years old, a respectable age for the newsletter of a development programme. How did it become a success and what can we learn from ***Bay of Bengal News?***

I remember the first publisher postponing the launching of the newsletter for two reasons. He said that you need a long-term commitment and you must have something to say.

The BBN has evolved over the years and has become a household name in fisheries circles around the Bay of Bengal. The basic criteria for a successful newsletter remain the same as those defined by the first publisher.

First, you have to be able to commit yourself, your organisation, to publish more than the odd issue and publish regularly. You also need to define your target group. The BOBP had poor fishermen and their families as the ultimate target group. The newsletter would not have been an effective tool to reach that target group directly. Instead, the target groups for the newsletter were fisheries administrators and managers, scientists, other projects and programmes, and mass media.

An important criterion for a successful newsletter is that what you write must be relevant. The content must be appropriate for your target group and must be useful. And by choosing the content carefully, the ***Bay of Bengal News*** was relevant. It reported on issues faced by fisheries administrators, project staff and fisherfolk in the region, it described in popular terms the approaches and methods the Programme used for its activities and surveys. And it reported on results - both successes and failures.

Finally, the BOBP hired a professional editor and professional artist. This is a lesson future newsletter publishers should remember. The professional approach ensures that the information is presented in a way that can be understood by the target groups, and with a lay-out that stimulates reading.

I had the privilege to work in the BOBP some 20 years ago. After my stint with the Programme I moved to Africa to start another regional FAO Programme. It followed the model of the BOBP, although with a more limited mandate (small-scale aquaculture). After a couple of years with ALCOM, it was time for us also to establish a forum for exchange of information in the region. The way forward after analysing the success of the ***Bay of Bengal News*** was obvious; make a long-term commitment, be regular, be relevant, use a language and a lay-out which stimulates your target group to read and to contribute. And hire a professional as editor.

We did not have the same resources in ALCOM as in the BOBP. But we managed to hire a professional, the first Editor of ***Bay of Bengal News!*** He produced ***Alcom News*** with contract help for layouts. ***Alcom News*** became a success story too.

Twenty-five years after ***BBN*** and with a revolution in communications today, it is relevant to ask questions about the future. The BOBP has become the BOBP-IGO, an inter-governmental organisation. What demands does that change imply? We have instant communication via Internet. What is the role, if any, of a newsletter in this age?

The BOBP-IGO is the natural follow-up to a long-lasting development programme. Although geographically more limited than the original programme, the new organisation serves the purpose of exchange of information – also as a possible platform for development interventions. We have seen the subjects for the BOBP change over the years. From very technical activities in boat and gear development – to extension methods, socio-economic issues and gender issues – to fisheries management in a broader sense.

Recently the BOBP-IGO organised a conference on safety at sea, a long-neglected subject in fisheries development! Other issues which are likely to become more and more important over the coming years are the quality of the final product, quality assurance, traceability – to name a few. BOBP-IGO is a forum that can take up these issues; it is also an efficient tool for regional activities. Donor agencies would be wise to note this and use the IGO. And member-countries would be wise to support the organisation and widen its membership.

The BOBP-IGO is needed to supplement the more research-oriented institutions of the region, not to compete with them. There is need for a forum for practical fisheries management in which fisheries administrators and managers can meet, share information and take joint actions to conserve the fragile fisheries in the Bay of Bengal.

And the newsletter? Whatever form it may take in the future, a print newsletter linked to a website is essential. The lessons from the last 25 years are still valid: long-term commitment, regularity, relevance and professionalism!

Indian Coast Guard in the Bay of Bengal: Economic Dimensions of Search and Rescue

Commandant **NV Rama Rao**, *Officer-in-Charge, Marine Rescue and Coordination Centre, Indian Coast Guard, Chennai*

An abridged version of a paper presented by the author at the recent Third International Fishing Industry Safety and Health Conference, held in Mahabalipuram from 1 to 4 February 2006.

India is a major fish producing country and fisheries is an important source of foreign exchange earning. It is also an instrument of livelihood for a large section of the economically backward coastal population.

Approximately six million fishermen from more than 3 930 villages in India fish in the coastal waters and on the high seas. Of these, 2.4 million are full-time fishermen, 1.45 million part time, the rest are occasional fishermen. Many of these fishermen do not carry basic life-saving equipment or SAR (search and rescue) alerting devices. They are therefore extremely vulnerable when disaster strikes, despite round-the-clock effort by SAR authorities.

Some 200 000 traditional crafts, 55 000 beach landing crafts with outboard motors and 51 000 mechanised crafts fish in India. The average length of these boats varies between 15 and 18 m (45-50 ft). None of the conventions such as SOLAS or GMDSS apply to them – since the Government of India's Distress & Safety Communication Rules, 1995 cover only fishing vessels more than 20 m in length. The salient features of these rules are:

- Vessels are to carry at least one float free EPIRB & one Search and Rescue Transponder (SART),
- VHF set manning channel 16 and capable of receiving and transmitting distress alerts on VHF DSC channel 70.
- Other mandatory requirements as per GMDSS.

Indian Coast Guard

The Indian Coast Guard was constituted under the Coast Guard Act, 1978. One of its "charter of duties" is to protect fishermen and assist them when they run into distress at sea.

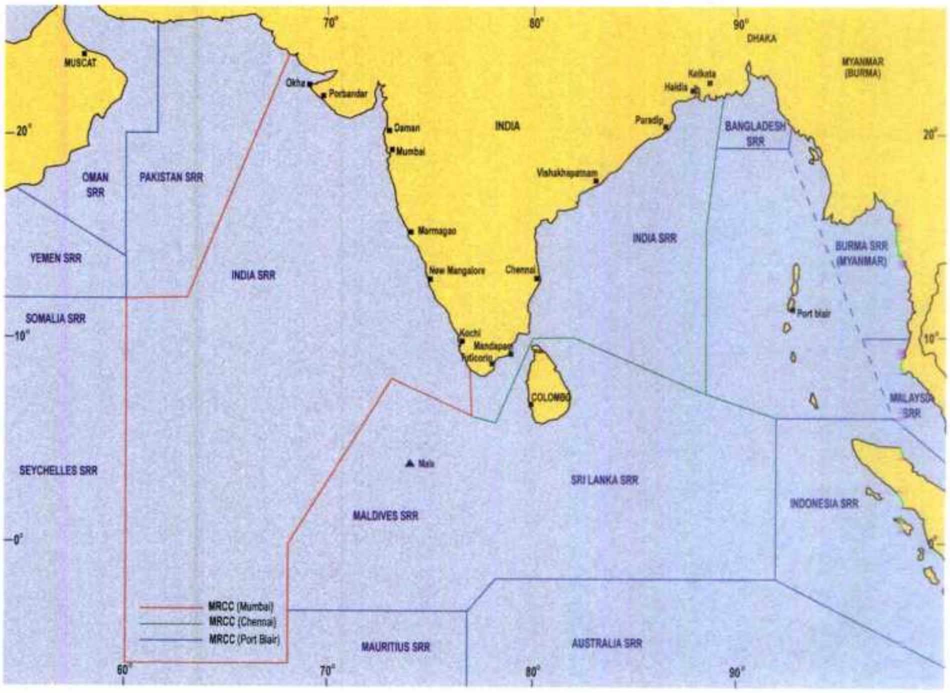
The Coast Guard has been helping fishermen on the basis of requests received from state governments by Coast Guard Commanders located in each coastal state. A schematic diagram is shown on page 6.

India acceded to the International SAR Convention 1979 in 2001. The following year, the Coast Guard was designated the nodal agency for coordination of SAR in the Indian Search and Rescue Region, measuring 4.6 million sq km (see figure 1).

Under the SAR Convention, the Coast Guard set up a National SAR Board, a chain of Maritime Rescue Coordination Centres (MRCCs) and a computerized ship-reporting system. In order to effectively coordinate SAR missions, MRCCs have been established in Mumbai, Chennai and Port Blair. These are assisted by a series of sub-centres located at the district headquarters of each coastal state (see figure 2).

All Coast Guard ships, shore stations and MRCCs/ MRSCs are equipped with GMDSS equipment

Fig 1. Indian Search and Rescue Region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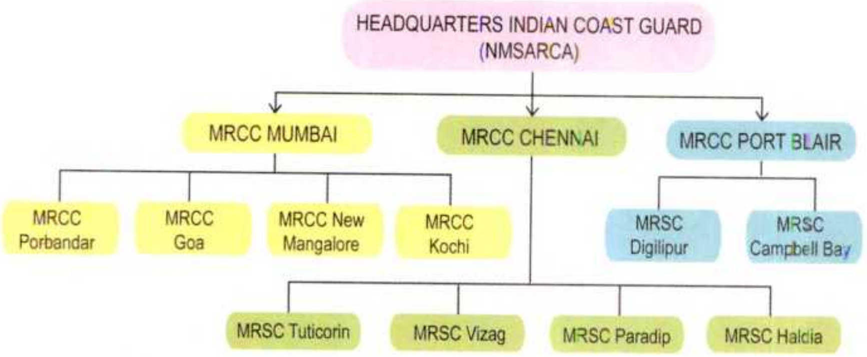

Fig 2. Indian Coast Guard Search and Rescue Organisation

comprising INMARSAT terminals, etc. Distress alerts from vessels are received at the MRCCs. Using the database of registered vessels with INMARSAT terminals, communication is established with the vessel by phone, fax or telex to ascertain the nature and type of distress and the assistance requirement.

Besides the resources available with the National SAR Coordinator (Director General, Coast Guard – DGCG), several other authorities and facilities can be requisitioned for carrying out SAR operations – such as ships/ aircrafts/ shore-based facilities with the Navy, the Air Force, the DG (Shipping), Customs and State Maritime Boards, and State/ Central fisheries authorities. The SAR authorities levy no costs for Search and Rescue of lives at sea.

SAR for Fishermen – Bay of Bengal

The Coast Guard has so far saved 3 342 lives since inception. In 2005 alone, 49 lives were saved through 34 SAR missions. Of these, 27 were fishermen in the Bay of Bengal. 49 cases of missing/ overdue fishermen were reported to MRCC Chennai and other MRSCs of this region.

In some cases, the fishing vessels returned safely before Coast Guard units were deployed. A total of 50 ship days and 67 hrs of air sorties were undertaken for SAR of fishermen alone in various SAR missions. The cost incurred during these operations was approximately Rupees 41.8 million.

The costs incurred by merchant ships can't be calculated with any degree of accuracy. The cost of diverting a merchant vessel to SAR operations is much more than the operating cost; the delay caused to the voyage adds substantially to costs. Therefore, the SAR services of merchant ships can't be cost-quantified.

SAR Deployment

Most fishermen do not carry any communication equipment or minimum life saving appliances onboard while venturing into sea. No emergency can be communicated to any vessel in the vicinity or shore authority. If a vessel capsizes suddenly, its fate is sealed in the absence of life-saving appliances. Most fishermen do not stick to their schedule or area of operation; at times, they delay their return according to the fish catch.

Sometimes, local authorities fail to report the safe return ashore of fishing boats and crew. Result: Coast Guard SAR units continue a vain search for the vessels and lives in distress. Unnecessary searches entail an expensive waste of SAR's assets and efforts. State fisheries authorities have been told about this many times in the past.

Our fishermen cannot afford EPIRBs and other sea safety equipment. But they have been persuaded to carry at least the bare minimum that's essential – such as life jackets and portable radio communication equipment.

An aircraft is the best and fastest means of locating a vessel in distress. If the latter can answer or respond to the aircraft during communication search, a rescue can be effected quickly.

Case Studies

Sri Lankan Fishing Boat *Lak Mali*

On 26 March 2005, MRCC Chennai received a telephone call from the Defence Attaché, Colombo. A Sri Lankan fishing vessel, *Lak Mali*, was disabled and adrift. Its approximate position was given. The assistance of the Indian Coast Guard was sought to search and locate the vessel.

Immediately, the Coast Guard vessel *Kittur Chennama*, then at sea, was diverted to locate the disabled fishing vessel. Two other vessels from Chennai – CGS *Ranijindan* and CG Dornier aircraft – were deployed for a SAR mission on March 27, 2005. The authorities in Sri Lanka were contacted regularly by MRCC, Chennai and the CG ship to ascertain the last known position of the fishing boat. International Safety Net messages were transmitted by MRCC Chennai at 12-hour intervals from the evening of 27 March till 31 March 2005 to report sighting by merchant vessels transiting through the area. But the missing boat could not be located in the computed area.

At last, on the evening of 1 April 2005, MV Gem of Ennore, an Indian Flag vessel, reported sighting the *Lak Mali* at a position approximately 345 NM north east of Chennai. MRCC Chennai requested the ship to tow the fishing boat to Chennai harbour but MV Gem was unable to do so, being fully loaded. But at the MRCC's request, the ship's crew provided a hand-held portable VHF set with a spare battery to *Lak Mali*. CGS *Priyadarshini* from Vizag then sailed to the area, established communication with FV *Lak Mali*, sighted the boat, rendered logistics and first aid and towed it to Chennai harbour. The *Lak Mali* had drifted 312 nautical miles, an average drift of 1.87 NM/hr.

If the Coast Guard were to compute costs for this SAR operation, the total cost for the operations of three ships – the CG Dornier (five sorties in 19 hours and 10 minutes), the *Priyadarshini* (three ship days), the *Chennamma* and the *Ranijindan* (five ship days) – would have worked out to Rs 7.4 million. (This figure excludes the cost for escorting the boat during its disability.)

The vessel was adrift and disabled. It had communication sets onboard, but these were crippled by power failure. Had the vessel been equipped with an EPIRB or SART, it could have been saved by CG aircraft on their first sortie.

Indian Fishing Vessel MDS-967

On August 9, 2004, MRCC was informed about a missing fishing boat, MDS-967. It had left Chennai with six crew on 26 July, was due to return on 6 August, but there was no sign of it. A search sortie was immediately undertaken, and two ships were alerted to look for the missing boat and render assistance. Three Safety Net messages covering the entire Bay of Bengal were transmitted by MRCC, Chennai in view of a possible drift of the boat towards Bangladesh or Myanmar.

On a report that the missing boat's crew had contacted the owners by cell phone off Kakinada, searches were diverted to that area. District Commanders in the region were requested to enhance surveillance. It was only on 30 Aug 2004 that the vessel's owners in Chennai reported drifting of the vessel to Teknaf in Cox's Bazar district, Bangladesh. MRCC contacted the authorities in Bangladesh and confirmed their safety.

The drifting of this boat to Bangladesh could have been avoided if it had some communication equipment, and either the owners or SAR authorities had been informed in time.

Initiatives by Indian Coast Guard

MRCCs are capable of receiving alerts through the COSPAS-SARSAT system from EPIRBs operating on 406 Mhz. These EPIRBs cost around Rs 50 000 in the international market; our fishermen can't afford them.

The Coast Guard has requested the Indian Space Research Organisation to develop a low-cost EPIRB costing below Rs 10 000 to enable our fishermen to relay any distress situation. They could also press one of four simple buttons to indicate distress. The EPIRB transmits the alert through the INSAT satellite system to a reception centre at the MRCCs. The SAR can then be initiated without any loss of time.

The low-cost EPIRBS are scheduled to complete extensive trials in 2006. They will then be ready for mass production. State governments will be requested to subsidize the costs and issue the transmitters to fishermen. Another Coast Guard initiative relates to training and community interaction programmes to educate fishermen on sea safety measures.

A toll-free four digit maritime SAR emergency telephone number 155204/(1718) has been activated all along the Indian coastline to warn about emergency at sea. These telephone numbers have been installed at all rescue co-coordinating centres, and are manned round the clock. Extensive publicity is given to fishermen to promptly report incidents of missing fishermen.

Fishing community initiatives

Innovations in technology are such that we can predict cyclones well in time. Certain fishing hamlets in Tamil Nadu are said to have monitored the movement of cyclones and issued warnings on their own. These warnings were heeded and fishermen stayed ashore. Similar efforts should be encouraged in all of India's coastal fishing villages. The local administration should be pro-active in monitoring the weather and preventing fishermen from venturing out to sea during rough weather.

Time is of the essence in SAR. The SAR authority has the best chance of locating a person or vessel in distress if it has been notified the relevant details – about the vessel, the persons missing, the area of vessel operation – by the quickest means possible.

Recommendations:

The following mandatory safety devices and measures are recommended for immediate implementation onboard all fishing vessels to optimize and economise SAR efforts and operations.

a) Traditional craft (vallams & catamarans).

- Life jackets and life floats for all crew.
- Hand-held VHF Sets/ GPS.
- Restricted area of operation, within the VHF range of a Coast VHF Station.
- Regular training on sea safety measures.

b) Mechanised fishing boats <20 m.

- Life jackets for all crew.
- Life floats onboard the vessel.
- 25 watt VHF set with Channel 16 and other frequencies.
- Hand-held GPS equipment.
- Low cost 406 Mhz EPIRB float free manually operated with GPS integrated.
- One SART (Search and Rescue Transponder).
- Restricted area of operation.
- Regular mandatory training on sea safety measures.
- Mandatory daily report to SAR agencies/state authorities.

c) Shore infrastructure

- VHF towers to be set up along the coast by state authorities at least 80 kms apart.
- Dissemination of weather bulletins and information on potential fishing zones.
- Recall of vessels during cyclones/storm surge.
- Encourage cellular operators to locate towers along the coast.

The International Labour Organization and the Safety and Health of Fishers

Ingrid Christensen, *Sr. Specialist on Occupational Safety and Health, ILO Sub-regional Office for South Asia, New Delhi* and **Brandt Wagner,** *Sr. Maritime and Fisheries Specialist, Sectoral Activities, ILO, Geneva*

This article, based on a paper presented at IFISH-3, describes the work of the ILO on improving occupational safety and health, with particular reference to fishers. It also discusses efforts to develop a Convention and recommendations on work in the fishing sector.

The International Labour Organization (ILO) was founded in 1919 to bring governments, employer and worker organizations together for united action in the cause of social justice and better working conditions everywhere. In 1946 it became the first specialized agency of the UN system. It is unique among such agencies in that it has a tripartite structure: not only government representatives but also employer and worker representatives take part and vote at its Conference and other meetings. The ILO has 178 member States.

The International Labour Conference meets in June every year to discuss the programme, the budget, various reports on the application of ILO standards, and adoption of new or revised standards. The Governing Body, which meets two or three times each year, determines the agenda of the Conference and directs the work of the International Labour Office. The International Labour Office is the permanent secretariat of the Organization, with headquarters in Geneva and offices in more than 40 countries. The Director-General is Mr Juan Somavia.

The primary goal of the ILO is to promote opportunities for men and women to obtain decent and productive work, in conditions of freedom, equity, security and human dignity ("Decent Work for All"). The ILO is seeking to achieve this goal in all sectors, including the fishing sector.

To take fisheries, an estimated 36 million people were engaged in capture fishing and aquaculture production worldwide in 1998, comprising 15 million full-time, 13 million part-time and 8 million occasional[1] workers. In 2000, an estimated 27 million persons were working solely in capture fishing worldwide.[2,3]

Asia accounts for an estimated 82 percent of fishers. At present, the small-scale fisheries sector accounts for roughly 45 per cent of the total catch.

Safety and Health in the Fishing Sector

The ILO's Tripartite Meeting on Safety and Health in the Fishing Industry (December 1999) concluded that:

"Fishing is a hazardous occupation when compared to other occupations. Sustained efforts are needed at all levels and by all parties to improve the safety and health of fishermen. The issue of safety and health must be considered broadly in order to identify and mitigate — if not eliminate – the underlying causes of accidents and diseases in this sector. Consideration also needs to be given to the great diversity within the industry based on the size of the vessel, type of fishing and gear, area of operation, etc."

Figures on accidents and injuries – collected as part of the preparation for a consolidated ILO Convention on Work in the Fishing Sector and its accompanying Recommendation (see below) support this conclusion.

In Japan in 2000, of the 88 fatal injuries for all workers covered by the Mariners' Law, 55 concerned fishers. Oxford University researchers say fishers have by far the most dangerous jobs in the United Kingdom. In the United States, the fatality rate in the fishing industry was 160 deaths per 100 000 workers in 1995; it rose to 179 per 100 000 in 1998. In 1996 this rate was 16 times higher for fishers than for other occupations such as fire-fighters, police and detectives and

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[1] *FAO: The state of the world fisheries and aquaculture (Rome, 2000), p. 3.*

[2] *Those engaged in fishing from which they gain less than one-third of their income or spend less than one-third of their work time.*

[3] *The ILO has made this estimate using FAO data. The ILO publishes a number of relevant series on workers in its Yearbook of Labour Statistics. These relate to total employment (paid employment plus self-employment) and persons in paid employment. All these series are classified according to economic activity, using either the International Standard Industrial Classification of all Economic Activities (ISIC) Revision 2 or ISIC Revision 3. Where ISIC Rev.3 is used, separate data may be available for fishing; otherwise, fishing is incorporated in Major Division 1 of ISIC Rev.2 along with agriculture, hunting and forestry. The data on total employment are also classified by occupation, according to the International Standard Classification of Occupations (ISCO) – either the 1968 revision (ISCO-68) or the 1988 revision (ISCO-88), at the major group level. Consequently, fishermen are not identified separately.*

eight times higher than the rate for persons operating motor vehicles for a living. In April 2001 the European Parliament adopted a resolution concerning safety and causes of accidents in fisheries which set out not only the high death and injury rate in this sector but also called for specific actions, including regulatory action, to improve this record at both the European and the international level[4]. For comparison, the average accident fatality rate per 100 000 workers for all occupations is about 12.5.

Additionally, the fishing industry entails other potential risk factors such as strenuous work, working in awkward positions and lifting of heavy loads, exposure to noise from engines and whole-body vibrations, exposure to difficult climatic conditions, long working hours and night shifts, disruption of social and family life and other psycho-social factors.

In many countries, the vast majority of people directly involved in seagoing activities are men. Apart from the physically demanding work, other factors too make it more difficult for women to enter this industry. But many of the pre-harvesting and post-harvesting activities are carried out by women.

Improving Safety and Health Conditions in Fisheries

Improving the safety and health conditions in the fishing sector requires interventions at international, national and local (workplace) levels. Government, employers, workers and their organizations – all of them must take active part in the process. At the international level, the ILO has organised Conventions and come out with recommendations, policy and strategy development, research and analysis, guidelines and other information materials. These activities include:

ILO Standards for the Fishing Sector

In its 87 years, the ILO has adopted five Conventions[5] and two Recommendations specifically concerned with conditions of work of fishers. These include:

- 1920: A recommendation on limiting the hours of work of all workers employed in the fishing industry.
- 1959: Conventions concerning minimum age, medical examination and articles of agreement of fishers.
- 1966: Conventions concerning fishers' competency certificates and fishing vessel crew accommodation, as well as a Recommendation concerning the vocational training of fishers.

The December 1999 ILO Tripartite Meeting made recommendations, on the basis of which the 2004 session of the International Labour Conference (ILC) was to discuss a comprehensive standard on work in the fishing sector. It was agreed that this standard should revise the seven existing ILO standards (five Conventions and two Recommendations), thus reflecting changes in the sector over the past 40 years; it was also agreed that the standard should reach or cover a greater proportion of the world's fishers, particularly those working on smaller vessels.

ILC 2004 discussed the proposal for a Convention and a Recommendation respectively. Another Tripartite Meeting of Experts on the Fishing Sector was convened in December 2004, and revised proposals for a Convention on Work in the Fishing Sector were tabled for ILC 2005.

The proposed Convention consisted of eight parts. (They dealt with definitions and scope; general principles; minimum requirements for work on board fishing vessels; conditions of service; accommodation and food; health protection, medical care and social security; compliance and enforcement; and amendment of annexes.) It also contained three annexes, which are integral part of the Convention and provide for: equivalence in units of measurement; fisher's work agreement; and fishing vessel accommodation.

The proposed Convention also dealt with Occupational Safety and Health (OSH) and accident prevention. It carried provisions concerning prevention of occupational accident and diseases, risk evaluation and management, training, young fishers below 18, reporting and investigation of accidents and the establishment of joint committees (or other appropriate bodies) on OSH. For larger boats, the Convention had more elaborate provisions.

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[4] *From Report submitted to ILC 2004*

[5] *A Convention is subject to ratification. Once a State has ratified a Convention, and the Convention has entered into force, the State is obliged to bring its domestic law and practice in conformity with the Convention provisions. A Recommendation is not open to ratification. Instead, it provides guidelines, including suggestions of a technical nature, to assist States in developing their national policy and practice with regard to the particular labour matter.*

However, as many of the participants of IFISH-3 may know, the proposed Convention and Recommendation were not adopted. There was doubt on whether these instruments would effectively address the situation of fishers working on small fishing vessels in developing countries. Another difficult matter was how to determine what standards should apply to small fishing vessels and what standards should apply to large fishing vessels – and where to draw the line between these categories.

In November 2005, the Governing Body decided that the proposed standards should be tabled at ILC 2007 after renewed consultation with member States. The ILO Secretariat said it would encourage IFISH-3 participants to take part in any national-level consultations and work out changes to improve the proposed Convention and Recommendation.

ILO and Occupational Safety and Health: The ILO has also had a long history concerning improvement of safety and health at workplaces across various economic sectors. This includes the adoption of about 70 Conventions and Recommendations related to OSH.

An example of such an instrument is the Occupational Safety and Health Convention, 1981 (No. 155), which prescribes the adoption of a coherent national policy on OSH and the working environment. It also outlines the general responsibilities and duties of governments, employers and workers. But it provides that member States may exclude fishing from its application. Some 40 member-States have ratified this Convention. The Convention on Occupational Health Services, 1985 (No. 161) is another one with a broad application.

The ILO has also adopted standards concerning OSH in specific sectors such as agriculture, mining, shipping and dock work. The Prevention of Accidents (Seafarers) Convention, 1970 (No. 134), sets out requirements for "seafarers". In many member States, the protection afforded by this Convention applies to fishers — or in some cases to fishers working on large fishing vessels. But in some other countries these laws apply only to "seafarers" working on board merchant marine vessels.

Likewise, laws relating to OSH-related issues such as medical examination, medical care at sea and working hours are aimed at seafarers. In some countries these laws extend to fishers, in some others only to fishers working on deep-sea vessels, in some countries they do not apply to fishers.

To reduce the estimated 2 million (+) deaths that occur annually because of occupational accidents and occupational diseases, a new ILO Global Strategy on OSH was adopted at the 91st Session of the ILC in 2003. This strategy has two pillars: (i) creation and maintenance of a national preventive safety and health culture; and (ii) introduction of a systems approach to OSH management. At the national level, the strategy envisages national OSH programmes, while at the enterprise level, ***the ILO Guidelines on Occupational Safety and Health Management Systems (ILO-OSH 2001)***, provide guidance for the strategy.

Apart from OSH within the proposed Fishing Convention, OSH was also tabled as an item by itself on the agenda of ILC 2005, during which a proposed Promotional Framework Instrument was to be discussed. This Framework Instrument, suggested by the Committee to take the form of a Convention and a Recommendation, lays out the basic requirements of an OSH national policy, an OSH national system and an OSH national programme.

Joint FAO/ILO/IMO work concerning the safety and health of fishers

To support the implementation at country level of the principles enshrined in the more formal standards, Conventions and Recommendations, the ILO has adopted a number of "Codes of Practice" concerning OSH in specific economic sectors. In the fishing sector, such Codes and other non-binding guidance have been jointly prepared with the FAO and the IMO. The three organizations have recently completed revising four such publications.

a) The FAO/ILO/IMO Document for Guidance on Training and Certification of Fishing Vessel Personnel is the recently revised

version of a document originally prepared by the FAO, ILO and IMO in the 1980s. It provides guidance for those developing, establishing or reviewing national training schemes, as well as certification programmes for fishing vessel personnel.

b) The FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels (Part A, safety and health practice for skippers and crews) addresses vessel safety; safety in machinery spaces and of mechanical equipment; fire precautions and fire-fighting; safety in fishing operations and fish handling; life-saving appliances and emergencies; abandoning the vessel; survival and rescue; safety of navigation and radio communications; shipboard facilities for crew members; health and medical care; survival from sudden, unexpected immersion in cold water; risk assessment; fatigue; and many other issues. It is divided into a general section concerning all fishing vessels, a section concerning un-decked vessels and decked vessels of less than 12 metres in length, and a section concerning decked vessels of 12 metres in length and over.

c) The FAO/ILO/IMO Code of Safety for Fishermen and Fishing Vessels (Part B, Safety and health requirements for the construction and equipment of fishing vessels) addresses a wide range of issues concerning the safe construction and equipping of vessels, as well as such issues as stability and associated seaworthiness. It takes into account the Protocol of 1993 to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977 and other relevant IMO work.

d) The FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels is similar to the Code, Part B, but it is aimed at vessels that are 12 meters in length and above, but less than 24 meters in length.

The ***re-establishment of livelihoods in tsunami-affected areas***, both for fishing and non-fishing communities, is another example of cooperation between FAO and ILO on specific issues, in this case at the country level.

A Sri Lankan fisher

Interventions at National and Workplace Levels

Implementation of the principles adopted *vis-a-vis* the standards at the national level and the workplace level, require the active participation of governments, organizations of employers and workers, and collaboration between employers and workers.

At the national level, governments in consultation with employers' and workers' organizations should establish the national framework for improvement of OSH in the fishing sector. Such a framework concerns many things: competent authorities, national policy, legislation and its enforcement, mechanism for cooperation and coordination among the stakeholders. Other instruments include awareness-raising and promotion, data collection and analyses, research as well as training and education.

In this context, employers' and workers' organizations as well as research institutions, NGOs, CBOs (community-based organizations), and projects such as the Bay of Bengal Programme can help transform national-level interventions into applicable interventions at the workplace level. Moreover, they should participate in discussions at the national level on how to advance OSH in a country.

For enterprise/ workplace interventions, **ILO-OSH 2001** (ILO Guidelines for Occupational Safety and Health Management Systems) provides a systematic management approach to safety and health for industries and sectors in general. It provides for larger workplaces to prepare a policy, establish an organization to implement the policy, plan and implement improvements to the working environment, monitor and evaluate the measures and finally assess the need for adjusting the management system. For small and micro-sized workplaces, including those within the fishing sector, less formal instruments would usually be more appropriate. For both approaches (small and large workplaces), the involvement of workers is a key factor.

Prevention Pays

Preventive measures toward safety and health are often perceived as being expensive. The ILO has since 1980 sought to promote safety, health, working conditions and productivity (or other management goals) at small and medium-sized enterprises.

The concept encourages the use of low-cost improvements wherever possible and of solutions/ methods/ techniques already implemented in a country or region. Training modules have been developed for specific sectors such as garments, agriculture and construction, and have been used in a number of countries of Asia, Africa, America and Europe. As a result, more than 100 000 improvements have been recorded in Vietnam in the agricultural sector. Fishing could be the next sector for which to adapt the general concept.

More information:

http://www.ilo.org/public/english/protection/safework/

http://www.ilo.org/public/english/dialogue/sector/sectors/mariti/fishing-iloact.htm

Strengthening Fisheries HRD in India - The Dynamic Role of the CIFE

India has vast and diverse marine and inland fisheries resources. In view of the need for trained and qualified manpower in this sector, the Central Institute of Fisheries Education (CIFE) was established on 6 June 1961 in Bombay (now Mumbai) as a Government of India institution with FAO/ UNDP assistance. Its activities started with a two-year post-graduate Diploma in Fisheries Science to fisheries personnel, mainly from departments of fisheries of the States/ Union Territories.

The Inland Fisheries Training Centre, started in 1947 by the Government of India, was taken over by CIFE in October 1967. The erstwhile Fisheries Extension Centers of the Government also became CIFE sub-centers for Inland Fisheries Operatives Training at Agra and Hyderabad. These centers were subsequently shifted to Lucknow (Uttar Pradesh) and Kakinada (Andhra Pradesh) respectively. The Institute also acquired the much needed aqua-farm infrastructure, with the transfer of the Brackishwater Fish Farm at Kakinada (August 1968) and the Freshwater Fish Farm at Balabhadrapuram (April 1974) from the Government of Andhra Pradesh.

CIFE became a part of the Indian Council of Agricultural Research (ICAR) in April 1979. The 36.87 meter training-cum-research vessel MFV Saraswati, acquired with NORAD support in December 1982, strengthened the CIFE's programmes in marine fisheries and oceanography. During this period, the training facility in freshwater aquaculture also got a boost with the acquisition of a 100-acre fish farm at Powerkheda from the

Dr Dilip Kumar, Director and Vice-Chancellor of CIFE, joined the Institute in September 2005. He believes in participatory approaches to fisheries development and management. Before this assignment, he helped set up the Network of Aquafarmers Associations in the Asia–Pacific region and helped develop an Asia Regional Aquatic Animal Health Certification and Quarantine System. Dr Kumar has developed and demonstrated a highly acclaimed model for fisheries co-management that ensures community participation in the management of coastal fisheries resources in Bangladesh.

The aquaculture extension approach popularly known as "Trickle Down System of Aquaculture Extension" which was conceptualized by him as an FAO expert, is now widely practised in Bangladesh and other Asian countries. The project won the prestigious Edouard Saouma Award for the year 1997. He spent more than 15 years with UN Agencies such as FAO, UNDP, NACA and assignments with other International Agencies such as IFAD and UNOPS; through them Dr Kumar played a pivotal role in fisheries development in several SAARC, ASEAN and East African countries including Bangladesh, Bhutan, Sri Lanka, Nepal, Thailand, Vietnam, Zambia, Zimbabwe, Kenya, etc. Dr Kumar's vision is to make CIFE a vibrant institution of international calibre. Dr Kumar can be contacted at dk.dilipkumar@gmail.com.

Box 1: Specializations offered for M.F. Sc and Ph. D courses

Fisheries Resource Management	M.F. Sc & Ph.D
Inland Aquaculture	M.F. Sc
Mariculture	M.F. Sc
Freshwater Aquaculture	M.F. Sc
Post-Harvest Technology	M.F. Sc & Ph.D
Fish Genetics	Ph.D
Fish Biotechnology	Ph.D
Fish Genetics & Biotechnology	M.F. Sc
Fish Nutrition & Biochemistry	M.F. Sc & Ph.D
Fish Pathology & Microbiology	M.F. Sc & Ph.D
Fish Business Management	M.F. Sc & Ph.D

Government of Madhya Pradesh. During 1984, an M.Sc course in fisheries management affiliated to the University of Bombay was started.

CIFE was accorded Deemed University status in March 1989 in recognition of its pioneering role in fisheries education. Consequently, masters and doctoral programmes (till then affiliated to the University of Bombay) were brought under the academic purview of CIFE. The Master of Fisheries Science (M.F.Sc) and Ph.D courses in mariculture affiliated to the Cochin University of Science and Technology were also brought under the CIFE banner. The Institute started two new M.F.Sc programmes in Freshwater Aquaculture and Post-harvest Technology at Central Institute of Fisheries Aquaculture, Bhubaneswar, and Central Institute of Fisheries Technology, Kochi, respectively.

Achievements

CIFE offers masters and doctoral programmes in different areas of fisheries sciences (Box 1) to provide qualified manpower to the sector. It offers vocational and refresher courses to fisheries development officials and aspiring entrepreneurs; it also provides consultancies to government organisations, NGOs and private companies.

The faculty is selected through an all-India examination, and students through all-India entrance tests. The courses are residential and ensure maximum student attention. Every student gets a scholarship. Only five students are selected for each branch of specialization. A well-equipped library, hostel, playground and gymnasium provide first-rate facilities.

Box 2: Significant Research Highlights

- Breeding of *Macrobrachium rosenbergii* using ground saline water.
- Cage culture trials of commercially important fishes in open waters.
- Development of value-added products from low-cost fish by modern and improved conventional methods.
- Larval rearing of giant freshwater prawn *Macrobrachium rosenbergii* in artificial seawater for establishment of backyard/ small-scale hatcheries in inland states.
- Use of ozone in shrimp and prawn hatcheries to treat water and control larval diseases in hatcheries.
- Development of carp hatcheries for breeding under controlled conditions.
- Culture of marine fin and shellfish in inland ground saline water.
- Culture of live food organisms for aqua hatcheries.
- DNA fingerprinting and RADP profiles of selected fish species.
- Hatchery for breeding of *Clarias batrachus*.
- Database development for marine fisheries of Maharashtra.
- EIA studies of shrimp farming in the coastal districts of Andhra Pradesh and Tamil Nadu.
- Field trials on standardization of indigenous hormone, ovatide, for breeding of Indian and exotic carps.

Since inception a total of 4 350 students including over 100 foreign students have completed their studies. Ph.D degrees were awarded to 72, M.F.Sc to 278, Post-Graduate Diplomas to 1 043 and 2 857 got Certificates.

A placement cell facilitates gainful employment for those who pass out of the Institute. The Dr Hiralal Choudhary Foundation Award is a gold medal for students securing the highest OGPA in different streams of M.F.Sc and Ph.D programmes every year. This foundation has also instituted annual awards for the best teacher, a young scientist, the best technical staff, the best supporting staff and the best extension worker for technology transfer.

The Institute also arranges annual lectures by an eminent personality in fisheries every year. Through the TATA Endowment Trust, CIFE arranges further training for the two best students of the Institute, one from M.F.Sc and one from Ph. D stream, in India and abroad. The Dilip R Jalihal Award is given to the best M.F.Sc thesis every year.

Staff and student researchers of CIFE take up a number of research programmes (Box 2). An important research area relates to aquaculture in saline soils. Recently, CIFE scientists have evolved a mechanism to breed prawn in such saline conditions. This will help boost the blue revolution in the heartland of India's green revolution. To improve the productivity of reservoirs, the institute has piloted cage culture trials of commercially important species. It has also conducted path-breaking research in genetics and biotechnology, in the development of value-added products, in database development and resource management.

Since its inception, the Institute has been serving the community in many ways. CIFE has facilitated a 'blue revolution' in Andhra Pradesh, demonstrated cage culture technology in Himachal Pradesh, Madhya Pradesh, Chattisgarh and Maharashtra. It is striving to set up

Students at work in the laboratory

Box 3: Thrust Areas

- Utilization of salt-affected inland areas through aquaculture.
- Genotype environment interaction studies of *Macrobrachium rosenbergii* for economically important traits.
- Non-food organisms in aquaculture.
- Sustainable fisheries development through co-management.
- Policy framework for Indian fisheries and aquaculture.
- Quality enhancement in fish.

freshwater prawn hatcheries using artificial sea water in the north-eastern states of Tripura, Mizoram and Manipur. It is collaborating with fisheries departments of many inland and coastal states on holistic development of fisheries in these states. The Institute has experimented with developmental models to improve the livelihoods of fisheries communities.

The Institute has taken up many collaborative ventures with private, government, co-operative and international institutions and NGOs. Examples: private companies like Godrej, Hemmo Pharma, Biostadt India Ltd, public sector institutions such as National Institute of Oceanography, Goa, National Environmental Engineering Research Institute, Nagpur; Central Drug Research Institute, Lucknow and Indian Space Research Organisation, Ahmedabad. It interacts actively with international agencies. In collaboration with Australia, it is developing aquaculture in degraded inland areas of India and Australia. Experts from reputed institutions sit in the CIFE's Board of Management, Academic Council, Research Advisory Council, and Extension Council. The Institute's course curricula are revised from time to time to meet current challenges.

The Institute has been playing pivotal role in fisheries education, nutritional security and policy formulation. CIFE alumni serve as torchbearers of institutions in India and abroad. In the field, the Institute has designed development models for north–eastern states, for fisherwomen and for poor Adivasi (tribal) villages. In the area of research, the CIFE has developed several technologies and at the policy level, the Institute is helping in the formulation of a national fisheries policy.

The Institute has been playing a key role in enhancing capabilities of fisheries departments in Afro-Asian countries by providing slots in its post-graduate programmes for its personnel. The Institute can also play a major role in enhancing Fisheries Education and Extension in the Bay of Bengal region.

Model of the new campus of CIFE

The Future

The CIFE has identified thrust areas for the future (Box 3). Fishing grounds are in open access and common property. The Institute recognises the urgent need to address co-management issues in fisheries.

The fisheries sector demands sustainable aquaculture systems, responsible fisheries, post-harvest management and research to augment productivity, efficiency, equity, sustainability and trade. CIFE endeavours to empower fishers and fisheries professionals towards these goals. It also aspires to be a global leader in fisheries education. In a globalizing world, CIFE has to provide education programmes that make students both nationally useful and globally aware. Curricula must therefore be developed that strengthen understanding of global phenomena and global trends. The latest teaching and pedagogical aids are required to meet these challenges. The process of entrepreneurship development must be stimulated. More details on the Institute can be seen at http://www.icar.org.in/cife/intro.htm.

A Quarter Century of *Bay of Bengal News*

by **S R Madhu**

Human beings desire longevity, so do journals! For any development journal, 25 years is a rare landmark. ***Bay of Bengal News*** (BBN) has just crossed it, and this issue — the 80th issue of BBN – celebrates the occasion. However, it is not an exercise in either narcissism or nostalgia. It is a factual and anecdotal review aimed at people concerned with development and communication. It is also significant for the BOBP's archives. The review is necessarily both selective and subjective.

How does the present BBN (June 2006) differ from that of the first issue (January 1981)? Black-and-white photographs have given way to colour, litho-offset paper to art paper. The manual design of yesteryear has given way to computerized design, with the power of Photoshop, Illustrator and Corel Draw reinforcing artistic creativity.

Why was BBN popular from the start? Because it applied to fisheries development the techniques of modern magazine journalism – imaginative design, professional action photographs, catchy headings, concise factual and anecdotal writing free of jargon, first-rate printing.

When BBN was born in January 1981, the few fisheries magazines in the region were mundane activity catalogues with little descriptive or analytical text. The mug shots or workshop snaps they printed generated little visual excitement. BBN therefore stood out with its creative design, flamboyant visuals and racy text.

What about the content of BBN? It has over a quarter century reflected the Programme's changing thrust and orientation. The first phase of the BOBP (1979-1986) focused on technology, the second phase (1987-1994) on communities and extension of technologies, the third phase (1994-2000, extended till March 2003) on management, the present Inter-Governmental Organisation (from April 2003) on sustainable development and management of coastal fisheries.

Dr Y S Yadava, director of the BOBP-IGO, recalls that BBN served as a medium of continuity between BOBP and the IGO. When the process of transforming the BOBP began, "I was advised to keep publishing the BBN."

Bay of Bengal News is only one of the information tools used by BOBP over the years. The others: technical reports, calendars, extension manuals, brochures, audio-visuals, video films, posters, exhibitions, CD-ROMs, comic books, CDs, the library. But BBN has been the oldest tool, it has had the widest reach, and the best impact.

BOBP's first director Lars Engvall, who published the first 52 issues of BBN, said that fisheries officials absorbed BOBP's technical work quicker from the short, simple articles of ***Bay of Bengal News*** than from detailed technical reports. To the surprise of many, BBN often published frank critiques of its own work, and highlighted problems and failures. Reason: failures are more useful as lessons and guidelines for future development than successes.

This article provides a few highlights of BBN coverage as well as of BOBP work during the past quarter century. BBN and BOBP are inter-twined!

The New York Times on BOBP

Early in its life (on January 22, 1981), BOBP made a little splash in the world's greatest newspaper, ***The New York Times***. (See the second issue of BBN, May 1981). ***New York Times*** correspondent K Kasturi Rangan was charmed by kattumarams and our beachcraft development work. His story headed "Innovative fishermen in India trying motorboats" inspired many phone calls and letters to the UN headquarters in New York.

Bewildered UN staff who hadn't heard of this project in faraway Madras, turned to the FAO headquarters in Rome for enlightenment.

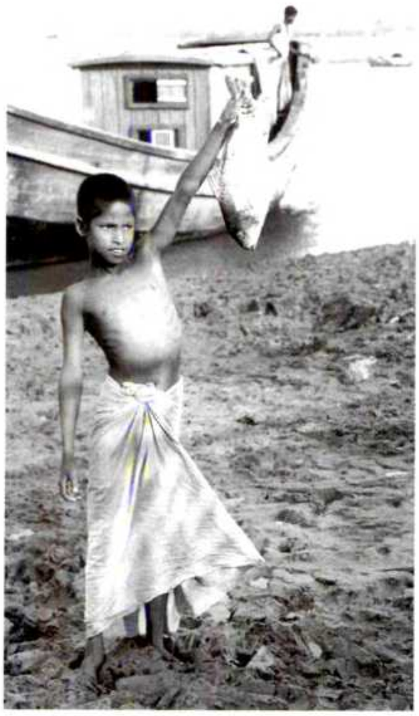
Photo exhibitions

One of the first major events in BOBP was a photo exhibition on small-scale fisheries held in 1981. The four-day event was inaugurated on October 16, World Food Day. It was also held in Colombo later – on December 5-7, 1981. About a hundred photographs of small-scale fishing communities and of BOBP work were on view in specially designed stands. The BBN of December 1981 published a sampling of the exhibition pictures in a four-page feature. Stunning!

Why the photo exhibition? To put small-scale fisheries in the limelight, to stimulate interest in our own work, to obtain attractive photographs for BBN, and build a photo collection. The exhibition was inaugurated in Chennai by Tamil Nadu's then Finance Minister V R Nedunchezian, and in Colombo by Fisheries Minister Festus Perera.

Photographs for the exhibition were shot by Harry Miller, photo editor of the ***Indian Express***, Chennai, who travelled to fishing villages of India, Bangladesh and Sri Lanka. In Bangladesh, Miller spent some time shooting a mechanic at work atop a boat at the Danida boatyard. Staff of DANIDA in Copenhagen were entranced by this picture (it appeared in the May 1981 BBN) and sent copies of it far and wide. Another poignant picture was of two Cox's Bazar fishermen, heads bent, hands busy, mending nets in the soft glow of twilight. A third photo winner: A smiling boy held aloft a fish like a trophy for Miller, and he eagerly clicked. What resulted was the signature photograph of the exhibition, reproduced by several newspapers and magazines, also in the BBN of May 1981.

In Kakinada, Miller crouched at the beach with his wide-angle lens as two slender women carrying a fish basket walked from the beach to the shore. Just before he clicked, a young man ran in between, and Miller exploded in wrath – as any photographer would. But the two women offered to recreate their walk for Miller's benefit despite being late for an auction. Result: a beautiful shot. It generated as much attention at the exhibition as it did in BBN's fourth issue (December 1981).



We built on the photo exhibition collection fairly systematically in later years. Our library gradually came to house thousands of slides, plus prints in color and b-w. These were catalogued and indexed. They are now being digitized.

A decade later, in July-August 1991 – the BOBP held an exhibition of photographs and drawings titled "Fisherfolk of the Bay" in Chennai in co-operation with the Alliance Francaise. A ***therukoothu*** (street play) performance by a Pulicat troupe was a highlight of the inaugural day. The exhibition, featured in the September 1991 BBN, again generated very good press coverage.

To get back to chronology. The June 1981 issue of BBN sparked an ebullient letter from Mr Kenneth Lucas, then FAO's Assistant Director-General of Fisheries. He asked for details of the staffing pattern, the methodology and the costs of BBN. He sent FAO fisheries projects worldwide a circular citing BBN, asking them to consider publishing newsletters to disseminate their work. Today, several FAO projects put out their own newsletters. ***Bay of Bengal News*** was definitely a trend-setter.

Fishing technology

During its initial years, BOBP carried out painstaking studies on making the traditional kattumaram more profitable. The studies dealt with chemical impregnation to strengthen kattumaram logs, and sourcing the Andaman Islands for more durable wooden logs. But the conclusion, in the words of director Lars Engvall, was that the kattumaram was a "near-perfect craft", thanks to centuries of evolution, and could not be improved in practically useful ways.

A Daniel of the Tamil Nadu Fisheries Department wrote a first-rate article on kattumarams (September 1981). Kattumaram fishermen were profiled in a few articles.

Fishing craft and gear technology fairly dominated the first few years of both BOBP and BBN. Extensive work was done on beachcraft. The work entailed research, design, development, building and testing of 14 prototypes; plus experiments on improving engines, sails, hulls and beach-hauling devices. Naval architect Oyvind Gulbrandsen of Norway spearheaded our beachcraft effort as consultant.

The pages of BBN reflected all this ferment. Some significant articles on beachcraft: "Better beachboats for India's east coast" (January 1981), "Beach-hauling devices" by Arild Overa (March 1983), "Beachcraft development: looking ahead" by Oyvind Gulbrandsen (March 1986); "BOBP beachcraft: how is the fishing performance?" by R Ravikumar (September 1987).

BBN published many creative and innovative sketches and diagrams on beachcraft. These contained either visual overviews or technical data with a clarity and detail that no photograph could provide, and delighted Lars Engvall and the fishing technology staff. They were prepared by E Amalore, a qualified engineering draughtsman. Example: A sequence motion diagram for surf-crossing.

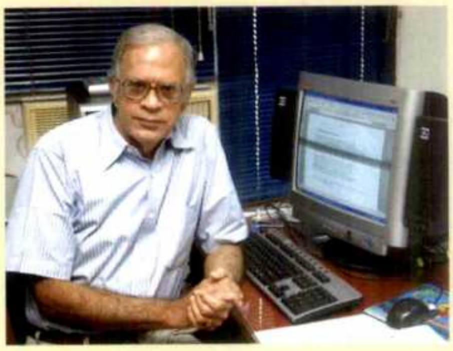
BOBP's fishing craft initiatives in Sri Lanka were described in many articles. Publisher Engvall said in his one-page "Letter from the Publisher" (December 1987), "An idea whose time has come" that multi-day trips for offshore fishing, advocated for a long time by many agencies including the BOBP, had suddenly arrived.

BOBP's extensive work on fishing gear was regularly reported in the BBN. Improvements were tried out with driftnets, trawls and set bagnets in Bangladesh; with fish aggregating devices in Sri Lanka. A major activity in India was the introduction of high-opening bottom trawls (HBT) in Tuticorin and Rameswaram. The rationale was that shrimp trawlers were usually busy only for four months a year. During the remaining months, shrimp trawlers could use HBT to catch fish (BBN, January & September 1981, March 1983).

The HBT turned out to be very successful – in fact so successful that they posed a threat to fishery resources.

In 1984, I accompanied a PTI (Press Trust of India) reporter and photographer Harry Miller to Rameswaram and Tuticorin for a demonstration of HBTs. The PTI reporter was swept off his feet by the success of HBTs. His sensational report about the HBT catches was flashed by newspapers from Kashmir to Kanyakumari, with front-page headlines about tons of fish being thrown into the sea. Owners of insulated vans from Bombay and Delhi air-dashed to Rameswaram and Tuticorin. BOBP became the best-known four-letter word in fisheries!

The first editor of *Bay of Bengal News*



Mr S R Madhu is the founding editor of ***Bay of Bengal News***. He edited the first 42 issues of BBN, from January 1981 to June 1991. He has also been associated as consultant with the last 24 issues of BBN.

Mr Madhu joined the Bay of Bengal Programme as Information Officer in September 1979 after 15 years as writer and editor with the mass media in Bombay and New Delhi. In 1991, he was transferred to an FAO programme in Africa as Information Officer. He has been a consultant since return to India four years later.

Mr Madhu believes that development projects should communicate regularly with several types of audiences – rural populations, scientists, policy-makers, donors, the media. A regular pictorial newsletter is an excellent tool for such communication; it enables and strengthens project visibility and impact. He lauds the enlightened support extended to the newsletter by the three directors of BOBP – Mr Lars Engvall, Dr Kee-chai Chong and Dr Y S Yadava.

On a personal note: My toughest "hardship experience" in the BOBP was a four-day assignment in Sonadia island in Bangladesh in 1984. We stayed in a BOBP hut – huts are the only form of housing in this all-fisherman island inhabited just five months a year. No tap water, no electricity, no toilets; you relieve yourself in the open. ("It's a great experience to work in Sonadia – you will never again take basic facilities for granted," said fishing technologist G Pajot.)

My assignment at Sonadia was to research and report for BBN on BOBP's experimental work on alternatives to the standard Behundi net. Some of the 3 000 Behundi fishermen in Sonadia were at BOBP's request trying out these alternatives – which, it was hoped, would either lower their costs or raise their incomes or both. (As it turned out, the results were not clear-cut and BOBP did not recommend the alternatives.)

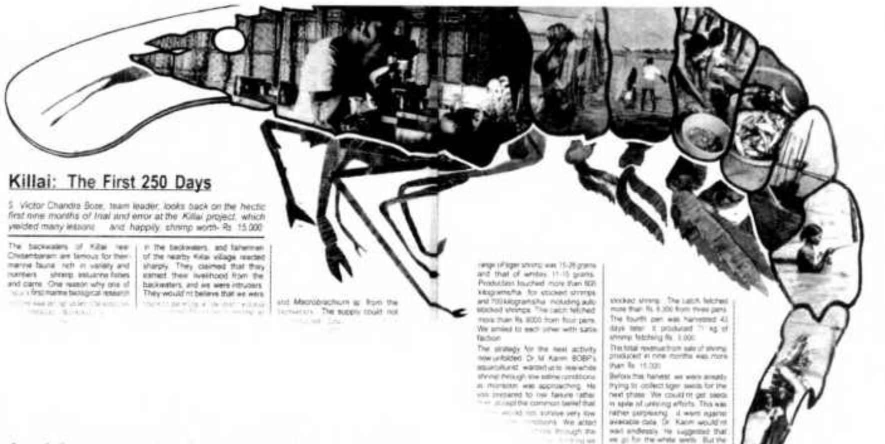
My human interest profile of Sonadia island (March 1984 BBN) aroused much interest outside Bangladesh; my article on the sensitive subject of the behundi fishery and our experimental work was scanned by many eyes and went through a few drafts before publication in BBN.

Aquaculture

Photographers are fond of marine fish capture (the interaction of man, fish, water and sky is full of visual interest), but artists adore aquaculture. That's what one would infer from ***Bay of Bengal News!*** Some of BBN's most arresting layouts have been inspired by our aquaculture work.

The pen culture project in Killai, near Chidambaram, Tamil Nadu, led to a superbly designed BBN (July 1983). Particularly ingenious was the illustration for the article "Killai: the first 250 days". What we had were several workmanlike pictures. Artist Amalore drew a giant-sized shrimp, arranged eight pictures within it, and got it reduced by photo-copier. Result: hypnotic! Inventive verve couldn't be bettered.

For an article on cockle culture in Malaysia (June 1985 BBN), no attractive photographs were available. But creativity provided a solution. Artists Amalore and S Jayaraj made a few hundred photo copies of a single cockle and gave a



Killai: The First 250 Days

S. Victor Chandra Bose, team leader, looks back on the hectic first nine months of trial and error at the Killai project, which yielded many lessons – and happily, shrimp worth Rs 15,000

double-spread of the article a cockle embroidery!

Bay of Bengal News was featured in an FAO Rome publication in 1987. Writing about newsletters of development projects, Tony Loftas of the FAO's Information Division said that some newsletters could be produced by an editor alone; a sophisticated newsletter like ***Bay of Bengal News*** was possible only with professional design inputs. He illustrated his article with a double-spread from the March 1987 BBN that was headed "Extending the shrimp culture bonanza to India's rural poor".

BBN reported frequently on the biggest success of BOBP's first phase — the finfish cage culture project in Phang Nga bay, Thailand. (Cage culture of finfish began in six villages of Phang Nga province in 1979. It took off, and spread to 26 villages in all the six coastal provinces of southern Thailand).

The Phang Nga success story was described in his usual concise style by the late Vernon Pietersz, the Program's Development Adviser, in the cover story of BBN, September 1982. The project's socio-economic impact a decade after introduction of cage culture was analysed again by Pietersz (BBN, June 1990). He said that prosperity powered by fish cage culture was evident in the metalled roads, houses of concrete and asbestos that replaced nipa thatch, the cars and motorcycles, TVs and refrigerators.

Oyster culture was a success in Malaysia — because of several factors including the participatory approach. (BBN, June 1991, March 1992, September 1992 and March 1993). Other culture projects (shrimp, seaweed, cockle) in India, Bangladesh, Sri Lanka, Malaysia and Thailand were less successful but yielded useful information and valuable lessons.

Aquaculturist Charles Angell did several interesting analyses for BBN of aquaculture projects and potential. Examples: March 1987 BBN (a workshop on shrimp culture on India's east coast), June 1987 (cover story on cockle management in Malaysia), March 1988 (shrimp feed formulation), December 1989 (seminar on seaweed production and utilization in the Bay of Bengal, held in Thailand), June 1990 (freshwater prawn fry marketing in Bangladesh).

Women's empowerment

Reports, articles and photo essays on women's issues are among BBN's most widely read stories. BOBP was the first agency in the region to systematically document the conditions of women in fisheries, and strategies to better their lot.

The setting up of a Fisherwomen's Extension Service in Tamil Nadu, a "link worker" training scheme in Chennai for women from 14 fishing villages, a regional workshop, socio-economic studies, training courses, women's self-help groups, credit schemes, income-generation activities – these were carried out in India, Bangladesh, Sri Lanka, and Thailand, and reported and investigated in ***Bay of Bengal News.***

"Improving the participation of women in fisheries in their own development" – this was one of the main aims of BOBP's work with fisherwomen.

The September 1989 cover story in BBN "We want a fish market," captured the determination of the fisherwomen of Besant Nagar, Chennai, and the development process set in motion by BOBP to train the women, get them to approach the Corporation of Madras and help them realize their dream of a fish market.

The December 1987 BBN cover feature "We are hungry only for seaweed" presented photo reportage

BAY OF BENGAL NEWS

BOBP BAY OF BENGAL PROGRAMME

"We are hungry only for SEAWEED"

Income options for women in Bangladesh fishing communities

on the women seaweed collectors of Chinnapalem village near Mandapam. S R Madhu wrote: "The energy, the skills and the stamina of Chinnapalem women, their bonhomie, their *joie de vivre* and smiling good humour in the face of adversity, are splendid to watch. Whoever said that our rural folk are passive and fatalistic, should meet the women of Chinnapalem. Salute them!"

This story led to inquiries from ***India Today*** magazine. Armed with our information and contacts, they sent a writer-photographer team to Mandapam. Result: another photo essay on the women seaweed collectors. An example of the multiplying impact of ***BBN.***

A beautiful photo feature on income-options for women in Bangladesh fisheries appeared in the December 1996 BBN.

People's participation

BOBP has always sought, promoted and documented a participatory approach to development. The very popular December 1986 BBN had a cover package on people's participation (PEP), with an introduction by Rathin Roy.

The issue also carried three fact-packed articles on "fisherfolk power in south India". They were about SIFFS, the South Indian Federation of Fishermen Societies, in Trivandrum; the Sangams of Kanyakumari; and a voluntary organization in Quilon. The issue went out of stock very soon.

A major BOBP contribution to PEP knowledge and literature was through a special one-year SIDA-funded project in 1986-87. The learnings from several activities were discussed at a regional consultation in Bangalore in May 1987 that brought together 45 participants from several countries. In the September 1987 BBN, Rathin Roy discussed the consultation and its findings.

Credit, non-formal education and other extension activities

In 1979, Orissa's Director of Fisheries requested BOBP to help train 15 newly recruited young extension officers. In 1981-82, BOBP implemented a one-year **in-service training programme.**

BOBP's training officer Uwe Tietze summarized the in-service programme in the June 1992 BBN. It was to consist of four modules – credit and financial assistance; community development; fishing craft and gear improvement. Each module would last three months and consist of a residential course, a pilot project and a final workshop.

The credit module paved the way for an outstanding **credit project for Orissa fisherfolk** – which is a favourite case-study at seminars worldwide on rural credit. In the March 1984 BBN, Uwe Tietze summarized the rationale and ***modus operandi*** of the project. He said credit for fisherfolk without subsidies would be viable provided it was preceded by the right preparation and documentation (including data on fisherfolk communities, fishing craft and gear, costs-and-earnings analyses of craft and gear); and the right degree of participation by multiple stakeholders.

The **non-formal education project for Orissa fisherfolk children** was also an offshoot of the training scheme. The December 1984 and December 1985 issues of BBN described the project in detail. In co-operation with various state agencies, UNICEF, and a full-time consultant (Ms Namita Ray), BOBP prepared a curriculum and some 120 booklets for fisherfolk children aged between 6 and 14. Some 20 non-formal centres were set up in four coastal districts of Orissa – Balasore, Cuttack, Puri, Ganjam.

Training Officer Uwe Tietze spent more time in Orissa than in Chennai, because of the work demanded by the in-service training, the credit and NFE projects. Following his work with BOBP, Tietze served the FAO in Rome for more than 20 years; He says the insights of his BOBP experience were invaluable throughout his career.

BOBP organized a first-of-its-kind **NFE project for adult fisherfolk in Tamil Nadu.** It was described in detail in the December 1983 and March 1985 issues of BBN. Materials were prepared for adult fisherfolk, for animators (teachers) and for trainers of animators in co-operation with NFE specialists. These were scrutinized by expert teams and reviewed at workshops.

A Trainers' Manual and an Animator's Guide published by BOBP sparked astonishing demand not just from all parts of India, but worldwide – demonstrating the need for these publications. In the March 1985 BBN, Valli Seshan and L S Saraswathi described the rationale and origin of the NFE project and the content of the many publications under the project.

The most heartening index of the project's success – it inspired an almost identical NFE package for rural populations in general by the Government of India, using the same consultants as the BOBP.

The March 1990 ***Bay of Bengal News*** carried an attractive photo

BAY OF BENGAL NEWS
BETTER BEACHBOATS FOR INDIA'S EAST COAST
HOW TO SAVE FUEL
BANK CREDIT FOR FISHERFOLK: ORISSA SETS AN EXAMPLE
Fishery Resources Research in the Bay of Bengal
SHRIMP CULTURE IN INDIA'S EAST COAST
SAFETY AT SEA
BOBP-SUPPORTED AQUACULTURE PROJECT IN THAILAND EXPERTS REVIEW PROGRESS
Finfish cage culture in Phang Nga, Thailand
WHEN FOXES ENTERED A SHRIMP POND...
Orissa Fisherfolk Children- A First-Rate Performance!
Better management through better knowledge : BOBP cockle activities in Malaysia
FOCUS ON POST-HARVEST TECHNOLOGY
Use of ice in Kakinada
Good News from Uppada
A seasonal bonanza for Palk Bay fishermen
The Tuna Fishery in India, Maldives and Sri Lanka
ENTERING UPON THE SIXTH YEAR
BOBP beachcraft in India : how is the fishing performance?
Field Day at Kothapatnam
PHOTO EXHIBITION ON SMALL-SCALE FISHERIES CHARMS VISITORS
EXCITING NEW FISHERY IN SRI LANKA
Higher catches and incomes for fishermen in Pesalai and Kalpitiya
Shrimp seed — any to sell? Come to Saikhura, Bangladesh
"We are hungry only for SEAWEED"
BOBP's new challenges
THE BAY OF BENGAL COMMITTEE
An Impressive Inaugural in Colombo
World Fisheries Conference 1984
FISHERIES AS IF PEOPLE MATTERED
New BOBP activities
"WE WANT A FISH MARKET!"
FISH AGGREGATING DEVICES
Sailpower in small-scale fisheries
COCKLE CULTURE IN MALAYSIA
PEOPLE'S PARTICIPATION
FOCUS ON MALACCA STRAITS
SEAWEED PRODUCTION AND UTILIZATION AROUND THE BAY OF BENGAL

This montage of 80 Bay of Bengal News front pages captures the variety and diversity of themes, concepts and designs between January 1981 and June 2006.

25 Years of Bay of Bengal News

80 issues... 80 covers

feature on an "integrated extension activities project" in 20-odd fishing villages of Ranong province, Thailand.

The project encompassed culture of oyster, grouper, mussel and shrimp; crab and squid traps; women's activities; health care, non-formal education, credit. The BBN photo feature presented several culture activities, plus a very effective health care activity at Kor Sin Hai that was the essence of simplicity.

Sri Lankan fisherfolk have a special empathy for radio – their companion for news and entertainment out in the sea. The Sri Lankan Broadcasting Corporation has been airing special **radio programmes for fisherfolk** from January 1989. The September 1990 ***Bay of Bengal News*** reported on an evaluation of these programmes by British expert Michael Pickstock, formerly of the BBC. He returned later and helped organize a regional **radio training workshop** in Colombo; Pickstock and S Muthiah were among the resource persons. The September 1991 BBN enhanced the impact and reach of the training through detailed articles.

The radio training workshop generated considerable interest in the Maldives – a country of scattered islands, where radio has been a binding force for fisherfolk from 1978. In April-May 1993, Pickstock was engaged to train 10 staff of the Voice of Maldives. "One small step for radio, one slightly bigger step for fisheries management," said an article in the September 1993 BBN.

Bay of Bengal News helped popularize RRA (Rapid Rural Appraisal) as an extension tool in the region, through actual practice, manuals and reports, and BBN articles (a cover story in June 1990; RRA in post-harvest fisheries in the September 1993 BBN).

Fisheries resources

Information on fishery resources in the Bay of Bengal? The question aroused a cynical smile way back in 1979. "Unavailable, unreliable" was the terse comment by an expert. The picture is different now; BOBP has made the difference, with a stream of technical papers and reports, and some avidly read BBN articles. There have been wide-ranging resource reviews, plus insightful analyses on shrimp, hilsa, tuna, mackerel, demersal fish, reef fish, ornamental fish.

Our first intervention in fishery resources was a 1980 consultation in Chittagong on stock assessment in fisheries of the Bay of Bengal. B T Antony Raja was the consultant and a demanding one. His fact-packed technical paper "Current knowledge on the shelf resources in the Bay of Bengal," was reprinted twice; but demand for it continued.

The first BBN article on resources, fittingly enough, was by Antony Raja. His May 1981 piece was titled: "Fisheries resources in the Bay of Bengal: what do we know about them?" It was accompanied by a profile of Raja.

A four-year resources project funded by the UNDP (1983-1986) provided valuable knowledge on fish stocks of the region – such as the tuna resources of Sri Lanka and Bangladesh, the hilsa resources of Bangladesh, the scad and mackerel resources of Malaysia and Thailand, the tuna resources of Thailand and Indonesia in the Andaman Sea.

Dr K Sivasubramaniam succinctly summed up this project's work in the May 1987 BBN. He said that the project reviewed management and assessment practices, investigated resources, helped to computerize data processing and stock assessment, trained national biologists in sampling techniques as well as in data collection and analysis, and brought out 15 publications.

What was the state of research on fishery resources in the region? Siebren C Venema did a cover story in the September 1985 BBN. He outlined nine key areas for resource research and action needed in each. The article was followed by concise data-laden "factsheets" in the BBN about fishery resources research in the region.

In August 1986, BOBP launched a two-year UNDP-funded project to study the abundance of reef fish resources in the Maldives and the gear that could best tap this resource. The project was reported and discussed in the March 1988, March 1989 and March 1992 issues of BBN.

The December 1992 BBN spotlighted shark-fishing in the Maldives. (This issue also described shark longlining on India's east coast and the shark fin trade in the Bay of Bengal.)

Radio programme for Sri Lankan fisherfolk

The "shoe dhoni" community of Andhra Pradesh

In 1991, BOBP introduced studies on bio-socio-economics to the region. The idea was not merely to improve the catches and incomes of fishers but also to improve their knowledge on resources and strengthen their participation in resource management. Dr Sivasubramaniam discussed the significant concept of bio-socio-economics in the December 1993 BBN. His article was followed by case-studies of six completed projects.

In sum, the BOBP's projects and publications, and the articles in ***Bay of Bengal News,*** have made a noticeable difference to fisheries resources knowledge in the Bay of Bengal. However, what still needs to be done in the region by way of resource information, databases and skill training is enormous.

Post-harvest fisheries

The BOBP initially carried out post-harvest activities – handling, processing and marketing of fish – through a project funded by the UK's Overseas Development Administration (ODA). This then became an independent project executed and funded by the UK's DFID under the BOBP umbrella.

Bay of Bengal News has published numerous articles over the years on post-harvest work: an aluminium fish container for fisherwomen, use of ice aboard small-scale craft, a permanent ice box, fish drying racks, fish smoking, fish marketing, discard of shrimp by-catch at sea, market research into fish consumption, better feed for shrimp.

Fisherfolk communities

An excellent BBN article on fisherfolk communities was the cover story of September 1990 – on a fisher community of Chollangi (near Kakinada in Andhra Pradesh) whose boats, the "shoe dhonis," are also their homes. Author Venkatesh Salagrama, who had been wanting to investigate the community even in his student days, and artist-photogapher E Amalore spent three days tracking this community.

BBN has also featured articles on fisher communities in Bangladesh (May 1981, March 1984, December 1990); India (December 1986, March 1989, March 2000); Sri Lanka (September 1990, December 1981); Maldives (March 1991); Thailand (March 1990, June 1990); and Indonesia (June 1991). The script of an audio-visual on small-scale fisherfolk communities in the region was published in the December 1990 BBN.

Fisheries management

Fisheries management was the focus of the BOBP's third phase, which began in 1995. Rationale: falling catch rates and rising pressure on fisheries resources everywhere, including the Bay of Bengal region. The BOBP's mandate was to facilitate management by raising awareness, strengthening the capacity of fisheries agencies, and providing technical assistance.

BBN spread management awareness by reporting and analyzing project activities and workshops, analysing management tools such as the stakeholder approach; and discussing success stories on fisheries management.

The management projects carried out by BOBP in member-countries were remarkably varied. It was **integrated reef resources management** in the Maldives –

checking damage to coral reefs, and developing a model for community-based reef resources management in four atolls – Vaavu, Meemu, Faafu, Dhaalu. (See BBN of March 1997, December 1998, June 1999.) In Sri Lanka, BOBP sought to study and document **ornamental fisheries**, promote awareness through seminars and workshops, organise insurance schemes and training courses for ornamental fish divers, and suggest management approaches (See BBN, December 1996, December 1997, 1998, June 1999).

The BBN of December 1996 made a big impact within and outside the Bay of Bengal region with its package of articles on ornamental fisheries in Sri Lanka by Rathindra Nath Roy and S R Madhu. "We had heard so much about ornamental fisheries; we now know what it is," was a comment from FAO Rome. The package contained factual interviews with ornamental fish divers; an interview-based article on Lumbini, Sri Lanka's biggest ornamental fish exporter; and an overview-article on the industry, why it needed management, and the BOBP's proposed activities.

In Bangladesh, BOBP sought to limit effort and resource damage caused by the **push net and set bagnet fisheries**, and simultaneously minimize hardship to the thousands of people who depend on these gear. UNDP, DFID and the Department of Fisheries took up BOBP's work. (See the articles "Parliamentarians consider food and livelihood security issues of coastal Bangladesh" – BBN, December 1997; "Managing the push-net and set bagnet fisheries in Bangladesh," December 2000 BBN).

In Thailand, the BOBP carried out a very successful **CBFM (community-based fisheries management)** project to overcome the problems of overfishing and resource stress in 110 villages of Phang Nga bay. The CBFM measures including a ban on trawl nets and push nets within 3 km of the shoreline; culture of finfish, oysters and mussels; installation of artificial reefs; voluntary surrender of push nets by fishers; sea ranchings; floating pontoons on the sea (See BBN of March 1997, June 1998, September 1998, December 1998, June 1999).

Ornamental fishes in reef ecosystem, Maldives

BOBP's summary of the CBFM project in Thailand was published in the third volume of the book "Sustainable development success stories" brought out by the U N Commission on Sustainable Development. The story was reproduced in the September 1999 BBN.

In India, three different management projects were carried out. In Kanyakumari district, Tamil Nadu, the aim was to **use GIS to produce maps on fishing intensity**, a first step toward scientific management. In Andhra Pradesh, **stakeholder** consultations were conducted to solve problems that plagued **shrimp culture.** A lavishly illustrated comic book was produced on shrimp culture to raise awareness of problems and of management techniques. In West Bengal, the use of **PRA as a tool for data collection and analysis** was popularized (See BBN of March 1997, March 1998, December 1998, June 1999, September 1999).

In Malaysia, a **Special Area Management Plan** was implemented for the Pulau Payar Marine Park. It sought to integrate land and water management, test strategies to strengthen eco-tourism and ensure resource sustainability, enhance knowledge about the carrying capacity of the park, strengthen underwater biodiversity. The project led to valuable lessons for the **management of marine parks in Malaysia.** (See BBN of December 1998).

In Indonesia, the problems were **inadequate management and enforcement,** and resource conflicts between groups of fishermen. BOBP adopted a two-pronged strategy of promoting CBFM concepts at the national level and organizing stakeholder consultations and technical inputs at the local level. A BOBP study researched traditional community-based fisheries management in six provinces of Indonesia. An ADB-funded project grew out of this study (BBN, December 2000).

The Code of Conduct for Responsible Fisheries (CCRF) was highlighted and promoted in the region by the BOBP. A special issue of BBN (September 2000) explained the provisions of the Code and its technical guidelines. A **"Fishermen's Week,"** held in some member-countries, was used to inform fisherfolk communities about the Code.

The BOBP's director during its third phase, Dr Kee-Chai Chong, was passionately committed to the

Small-scale fisheries – an important component of marine fisheries in Bangladesh

concept of management. Through his many articles in BBN, he kept drilling the messages: respect nature, conserve resources, save more and spend less, tap the wisdom of the ancients, think about the future.

The BBN published several articles that documented the learnings from the third phase of BOBP, on the basis of the findings of a two-member mission – Mr G L Preston and Dr Y S Yadava (March 2000 and June 2000 BBN).

Reviews of BOBP

Two articles in ***Bay of Bengal News*** have summarized in words and pictures the work of the organization over the first 20 years. The December 2000 BBN carried the article "Glimpses into the BOBP's achievements, 1979-2000," describing the Programme's work phase by phase. The January 2002-March 2003 issue, a curtain-raiser to the formation of the BOBP-IGO, presented in a nutshell the BOBP's work over 23 years by discipline.

Sustainable development and management of coastal fisheries

The BOBP-IGO came into being in April 2003, with Bangladesh, India, Maldives and Sri Lanka as members. Its goal: Sustainable development and management of coastal fisheries. The emphasis is on shared learning and information exchange. Activities: Safety at sea, Code of Conduct for Responsible Fisheries, poverty alleviation, women's issues, reducing post-harvest losses, stock assessment, knowledge exchange and transfer.

The director of the IGO, Dr Y S Yadava, served earlier as India's Fisheries Development Commissioner, and had contributed articles to ***Bay of Bengal News.*** He sees the BBN as an important instrument to carry out the mandate of the IGO. Six issues of the BBN have covered the IGO phase.

BBN has documented and analysed the destruction caused by the tsunami of December 26, 2004, including a one-day consultation among fisherfolk throughout Tamil Nadu in Chennai, and a post-tsunami workshop in Mahabalipuram. As a positive measure for the fisheries of tomorrow, the IGO organised art contests on "Life after Tsunami" for schoolchildren of India, Sri Lanka and Maldives. Two well-illustrated articles in BBN, and a beautiful calendar for 2006, were part of the outcomes.

Life after Tsunami – Malé school children participating in the art contest

The BBN has constantly drawn the attention of the global community to occupational hazards connected with sea fishing – through the Regional Conference on Sea Safety held in Chennai during October 2001, which adopted a "Chennai Declaration" and subsequently through IFISH-3 (The Third International Conference on Safety and Health in the Fishing Industry) held in Mahabalipuram in February 2006. The Conference and its papers have been published in detail in BBN.

The BBN is becoming an important print medium for publicizing the implementation of the Code of Conduct for Responsible Fisheries in the region. It is popularizing the CCRF in several ways – reporting the activities of the IGO in member-countries, articles on the CCRF Technical Guidelines, etc.

Way back in 1982, a reader in Colombo exclaimed, "Every issue of ***Bay of Bengal News*** seems to be better than the previous one." That was a conscious aim, and it will continue to be so.

The proposed ILO fishing standards and their relevance to small-scale fisheries

Sebastian Mathew, *International Collective in Support of Fishworkers*

A majority of the world's fishers ***are from artisanal and small-scale fisheries. Small-scale fishing vessels now go out further into the sea than before and even employ labour on wages. The author outlines the proposed ILO labour standards for fisheries (which will come up at an ILO Conference in 2007) and argues that these are capable of addressing critical issues concerning small-scale fisheries – such as safety, health, social security and working conditions.***

Fisheries is one of the main sources of income and food security in several developing countries, particularly in Asia and Africa. An estimated 28 million people, including some 15 to 20 million small-scale fishers, depend on marine capture fisheries for employment and income.

About 45 per cent of the marine fish production for direct human consumption originates from small-scale fisheries.

Most fishers work onboard vessels less than 24 m length overall (LOA) or 100 gross tons (GT). In fact, a majority of fishing vessels, both in developed and developing countries, are below 12 m LOA. Large marine fishing vessels (above 100 GT or 24 m LOA) number about 24 000 and employ about 200 000 people.

Under the 1982 U N Convention on the Law of the Sea, small-scale fishing vessels no longer confine themselves to the littoral waters. They are now found all over the exclusive economic zones (EEZ) and even beyond, including the waters of other coastal States. Some significant technological adaptations have made this possible. Those on board include not just fishers and family members but hired labour, even migrant workers. Distinct work categories are emerging in small-scale fisheries – of worker, skipper and owner. Employer-employee relations are a fact of life.

Proposed ILO labour standards for the fishing sector

The proposed Work in Fishing Convention, 2005, was to be adopted at the 93rd Session of the International Labour Conference in June 2005 at Geneva. Since the required quorum was not attained, the proposed Convention will once again come up for voting at the 96th Session of the International Labour Conference in 2007.

The proposed ILO labour standards for the fishing sector intend to reach more of the world's fishers, particularly those working on board smaller vessels, than before. The Convention, ***inter alia*****,** has proposed for adoption a set of general principles, plus minimum requirements for work on board fishing vessels, conditions of service, accommodation and food, medical care, health protection and social security, and compliance and enforcement.

The definition of "commercial fishing" has been broadened to include all but subsistence and

Royapuram fishing harbour, Chennai, India – Young fishers at work

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This article is based on a presentation made by Mr Sebastian Mathew at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, Chennai, 1-4 February 2006.

recreational fishing in marine and inland waters. The term "fisher" has been broadened to include persons working on board who are paid on the basis of a share of the catch. Protection provided for fishers working on vessels 24 m and over may be extended to fishers working on smaller vessels as well.

On the other hand, provisions have been proposed to exclude fishing vessels operating in rivers, lakes and canals from the requirements of the Convention. A decision on these provisions will be taken in consultation with representatives of employers and fishers.

The proposed Convention is thus more flexible. It moves from larger to smaller fishing vessels, and from fishers aboard larger vessels to those on smaller ones. The Convention and its standards are capable of responding more meaningfully to the safety requirements of small-scale fishing vessels.

(i) "General Principles" of the proposed Convention: While the fishing vessel **owner** must ensure that the skipper has the resources and facilities to comply with the obligations of the Convention, the **skipper** is responsible for the safety of fishers on board and the safe operation of the vessel. The skipper has to ensure that fishers perform their work in the best conditions of safety and health.

(ii) Minimum requirements to work on board fishing vessels: These are attainment of a minimum age and passing of a medical examination. Minimum age provisions will apply to fishers on board all types of fishing vessels; the medical certificate requirement is proposed mainly for fishers on board vessels 24 m in length or longer, or for fishers of vessels that stay at sea more than three days.

The minimum age for work on board a fishing vessel will be 16 years. This could be reduced to 15 years for persons who are no longer subject to compulsory schooling. But the minimum age for activities on board fishing vessels that are likely to jeopardize the health, safety or morals of young persons will be not less than 18 years. The engagement of fishers under the age of 18 for work at night is prohibited on health grounds.

Fishers who work on board fishing vessels are expected to hold a medical certificate of fitness to perform their duties. However, exemptions could be made for fishers aboard fishing vessels that are less than 24 metres length.

For vessels 24 m in length and over, or vessels that normally remain at sea more than three days, a medical certificate must attest that the fisher's sight and hearing are satisfactory for vessel duty. Also, that he/ she has no medical condition that will endanger the health of other persons on board, or that will get aggravated by service at sea.

(iii) Conditions of service

These describe provisions for manning and rest hours, a crew list, a fisher's work agreement, placement and repatriation of fishers, and payment of fishers. Owners of fishing vessels are to ensure that the vessels are sufficiently and safely manned with at least the minimum crew necessary for the safe navigation and operation of the vessel. The owners are also to ensure that fishers are given enough regular rest to ensure their health and safety.

It may be difficult to apply this standard to small-scale fishing vessels that are operated by owner-operators, especially to those engaged in near shore operations. However, the requirement is relevant to small-scale fishing operations of longer duration. It is particularly applicable to fishing vessels with separate categories of owner, skipper and worker. Example: the multi-day fishing vessels of Sri Lanka or India.

There are additional requirements for minimum manpower levels for the safe navigation of vessels 24 m in length and over. Minimum rest periods are stipulated for fishers in vessels – regardless of size – that remain at sea more than three days.

Every fishing vessel is required to carry a crew list and give a copy to the competent authority ashore. This requirement will help the authorities to identify and rescue someone who is lost at sea, or provide benefits to the right people in the event of death at sea. This crew list requirement is difficult to implement for beach-based fisheries, but is very relevant for multi-day fishing operations – especially those undertaken in distant waters.

It is proposed that ILO member-states should pass a law helping fishers – they should be protected by a work agreement they can understand. But it seems as if this law would apply mainly to international fishing vessels. How it would apply to small-scale fishing vessels that do not have distinct owner-skipper-worker categories is not clear.

A fishing vessel owner must repatriate a fisher at his/ her (the owner's) expense if the fisher's work agreement has expired, or if the fisher can no longer carry out his/ her duties on entering a foreign port. If the owner fails to repatriate the fisher, his/ her country must do so and recover the cost from the owner. Workers on small-scale vessels that fish in the EEZs of other countries could benefit from this regulation. But no such work agreements exist in practice.

Any private agency that recruits fishers should comply with a standard system of licensing. The State must regulate the system to ensure that fishers are not prevented from working, and that they are not charged any fees for recruitment.
If such regulations are violated, the private agency must be suspended or its licence withdrawn. Such a law will benefit migrant small-scale fishers, especially those from South Asia working on fishing vessels in the Middle East, including small-scale vessels.

ILO member-countries must ensure that fishers are paid regularly and are able to send money to their families at no cost. This provision will benefit fishers on small-scale fishing vessels too, especially those working abroad, or those using foreign ports to land fish or change crew.

(iv) Accommodation and food

The draft Convention proposes that accommodation on board fishing vessels should be appropriate – in size, quality and equipment – for the vessel's duties and for the length of time fishers live on board. Some of the points would apply to small-scale fishing vessels that go out on 3-day fishing trips or longer, and will have the effect of reducing fatigue and disease among fishers. The provisions for adequate supply of nutritional food and potable water are particularly relevant to fishers of small-scale fishing vessels that undertake multi-day fishing.

(v) Medical care, health protection, and social security

It is envisaged that fishing vessels will carry medical equipment and supplies that are sufficient for the number of fishers on board the vessels, the area of operation and the length of the voyage. At least one person on board must be qualified or trained in first aid and must be capable of using the medical equipment.

Fishing vessels should be equipped for radio or satellite communication with services ashore that provide medical advice. Fishers are entitled to medical treatment ashore and to be taken ashore promptly for treatment in the event of serious injury or illness. There are mandatory measures for medical care of fishers on fishing vessels of 24 m in length and over.

Some measures relate to occupational safety and health and accident prevention. The emphasis is on developing legal regimes that seek to prevent occupational accidents and diseases. Work-related risks on board fishing vessels must be reduced as well, through management and training and onboard instruction of fishers.

Fishers must be trained to handle the fishing gear they will use, and comprehend the fishing operations they will engage in. It is proposed that for fishers under the age of 18, fishing vessel owners, fishers and others will be jointly responsible for their safety and health.

Accidents on board fishing vessels must be investigated and reported. Under informal regimes to recruit and employ fishers on fishing vessels, it may be difficult to introduce risk evaluation and management. The recruitment system for fishers would have to change to bring in new perspectives on occupational safety, health and accident prevention.

Some additional measures are proposed for vessels larger than 24 m that normally remain at sea more than three days. These relate to owner responsibility for onboard procedures to prevent occupational accidents, injuries and diseases. The fishing vessel's owner, skipper and fishers must be given guidance and training on how to assess and manage risks to safety and health on board fishing vessels.

The member-country must extend social security protection to fishers ordinarily resident in its territory. The conditions for such security must be comparable to those applicable to other workers. Comprehensive social security protection for all fishers is proposed as a long-term goal. Bilateral and multilateral agreements are proposed to progressively achieve this goal for fishers. Unions of small-scale fishers in several developing countries are demanding social security for fishers working on smaller vessels.

The member-country must ensure that fishers are protected against work-related sickness, injury or death, through a system of compulsory insurance, worker compensation or other schemes that impose certain obligations on fishing vessel owners. Fishers should have access to medical care and compensation in the event of injury due to occupational accident or disease.

In the absence of national provisions for fishers, each member-country must ensure that fishing vessel owners are responsible for health protection and medical care for fishers. Vessel owners should defray the expenses of medical care during treatment in a foreign country until the fisher has been repatriated.

(vi) Compliance and enforcement

Member-countries are required to exercise effective jurisdiction and control over vessels that fly their flag. They must do this by establishing systems for compliance with the standards of the Convention – including inspection, reporting, monitoring, complaints procedures, appropriate penalties and corrective measures.

The port State is required to inform the government of the vessel's flag if it receives a complaint – from a fisher, an association or a trade union — that a particular vessel does not conform to the standards of the proposed Convention.

In conclusion, the ILO developed standards for the fishing sector some 40 years ago. The proposed Fishing Convention reflects changes in the sector during the past 40 years. It broadens the scope of fishing standards to benefit fishers on smaller fishing vessels. It addresses critical issues such as safety and health in fisheries, and the social security of fishers.

The ILO Convention is therefore relevant for small-scale fisheries. As the sector transforms further, the Convention – once adopted – will be even more relevant and useful in improving labour standards even for smaller vessels.

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As Others See *Bay of Bengal News*

Here's a sampling of some reactions to* Bay of Bengal News *on the occasion of its completing a quarter century.

"Always different from other publications"

In the first half of the 1980s, when I was Training and Extension Officer, of the BOBP, its newsletter was read with great interest within and outside the Bay of Bengal region. Many of its readers were active players in development.

During these early years of small-scale fisheries development in the Bay of Bengal, ***Bay of Bengal News*** stimulated debate on a number of innovative and challenging issues – such as the role of women in the development of rural communities; the consideration of economic and social concerns *vis-à-vis* a simple transfer of technology; access of rural communities to rural infrastructure and services; as well as the need to adapt technologies and methods to the needs and circumstances of small-scale fishers and fish farmers.

Bay of Bengal News has always been different from other development publications. The most important difference is probably that the readers of BBN became a part of the wide spectrum of partners and stakeholders who took part in the BOBP's development initiatives.

BAY OF BENGAL NEWS

Orissa Fisherfolk Children-
A First-Rate Performance!

Thus, a long-term relationship was established between readers and the newsletter. This may be one of the reasons why readers still remember articles in the ***Bay of Bengal News*** long after they appeared, and why the BBN has had a long-lasting impact on many of its readers.

To cite an example. I attended the World Congress on Agricultural and Rural Finance in Addis Ababa, held on November 25 – 27, 2005. After my presentation on the prospects and challenges of agricultural and rural finance in Asia and the Pacific, representatives of several financial institutions approached me and asked whether I had been associated with the fishery credit activities of the BOBP. Reference was made, among other things, to articles in ***Bay of Bengal News***. I was certainly pleased to confirm my association!

It is interesting to note that the principles that guided the successful credit programmes for fishing communities in Orissa ("Bank credit for fisherfolk: Orissa sets an example". BBN, March 1984), have now been widely adopted by most agricultural and rural banks in Asia for their rural credit and microfinance operations.

When visiting Orissa again two decades later in 2005 on a mission for FAO, I was pleasantly surprised to see that the Marine Fisheries Extension Service (MFES) which I had helped to establish in the first half of the 1980s, was still operating. Staff of the MFES were aware of the past history and achievements of the service, probably due to the article "In-service training of Orissa extension officers: an assessment" in the June 1985 issue of ***Bay of Bengal News.***

I was also pleased to learn that the efforts to raise the literacy and awareness levels among Orissa fisher communities – which I helped through the BOBP – were now being continued by NGOs. Members of both NGOs and the marine fisheries extension service, remembered the ***Bay of Bengal News*** articles on the non-formal primary education curriculum introduced by BOBP in the beginning of the 1980s – such as "Orissa fisherfolk children learn the 3 R's and more", BBN, December 1984, by S R Madhu and "Orissa fisherfolk children – a first rate performance", BBN December 1985, by Namita Ray.

These articles had obviously succeeded in promoting educational efforts among Orissa's fishing communities – which in turn are helping fisherfolk improve their livelihoods, their participation in local government, their conservation and management of natural resources.

– Uwe Tietze
Fisheries Consultant, USA
(formerly Fisheries Industries Officer, FAO Rome)

"The only formal source of fisheries news in the Maldives"

Bay of Bengal News has been a very important source of information dissemination on coastal traditional fisheries issues in the region. It has always focused on the most critical regional fisheries and aquaculture development issues, fishing craft, gear and methods. BBN is probably the only formal publication with news and features on Maldivian fisherfolk and on socio-economic issues. I would not hesitate to characterize BBN as the voice of information on fisheries in the Bay of Bengal region.

I congratulate all those who have contributed to the production of BBN regularly over the past 25 years – especially Dr Y S Yadava, who has worked tirelessly to compile such valuable banks of information. I think it would be worthwhile to PDF all the back issues and make them available on your website in a searchable form.

– Abdulla Naseer
Executive Director,
Ministry of Fisheries, Agriculture & Marine Resources, Maldives

BOBP and the BBN

The BOBP during its past 25 years has filled a huge gap in fisheries development. Until this Programme came to the scene, marine fisheries focused routinely on fishing and technology-related issues. Socio-economics was limited to data collection and statistics. The BOBP's many studies and programmes brought little-known socio-economic aspects to the fore. ***Bay of Bengal News*** explained and summarized such studies with clarity, conviction and charm.

I think the BOBP's work has not been utilized wisely. Its findings – reported and analysed so well in ***Bay of Bengal News*** and the many technical reports – have not been examined, let alone implemented. Reasons? Possibly lethargy, lack of finance for follow-up, lack of staff, lack of planning, lack of understanding about the seriousness of various issues. Whatever the reasons, the BOBP's good work has not fully translated into benefits for fisherfolk.

BBN and other publications of the BOBP ought to have been translated from English to the vernacular. The messages on overfishing, management, diversification, coastal aquaculture, post-harvest handling, processing for value addition, marketing of fish catch, basic infrastructure, fisherfolk problems, technology upgradation, etc, have reached only a few.

Studies and pilot projects, however good, are not enough. They merely adorn bookshelves. Only field-level implementation on a wide-scale can make an impact on fisheries and fisherfolk. The BOBP should not depend on Government agencies for actual implementation. It has tried implementation in a small way; with its small budget, it could not do more.

A few demonstrations in a few fishing villages don't go far. BOBP should have adopted a few fisher villages and made them show-windows for holistic development. This would have caught the attention of Government agencies and induced large-scale replication. ***Bay of Bengal News*** could have helped the process.

In future, BOBP should put more effort into weaning fishers away from fishing and induce them to take up coastal aquaculture and seafarming. Polyculture of shrimp, mudcrab, Chanos/ mullets and seaweed; seaweed farming in the open sea; cage culture of finfishes in wave-resistant cages in the open sea; bivalve farming in coastal waters – these should be promoted as livelihoods of promise in India. I hope to read about these efforts in ***Bay of Bengal News.***

The coastal aquaculture and mariculture technology of Southeast Asia and China should be introduced in India through demonstration and training. Livelihood support programmes should be organized to rehabilitate estuarine and inshore traditional fishermen who harvest juveniles in bag/ stake nets, or carry out shore seining or dynamite/ cyanide fishing. Successful programmes in one or two villages will serve as a model for more.

I'm all admiration for the many attractive articles in ***Bay of Bengal News*** illustrated with photographs, sketches and diagrams. They have been very effective communication tools. I would also like to congratulate BOBP's staff over the years. If the Programme carries out some of the suggestions I have mentioned, the impact on small-scale fisheries and fisher communities will be huge.

– M Sakthivel
President, Aquaculture Foundation of India, Chennai

Declining Appetite for Responsible Fisheries Management

During its third phase from 1995, the BOBP tirelessly promoted the virtues of fisheries management, and tried out an array of initiatives in all the seven member-countries. These were often discussed in *Bay of Bengal News*. The response was good. But where is management now?

The appetite for fish (used generically to include food and non-food fish) continues to grow. International trade in fish products alone is worth about US$ 71 billion annually. This appetite would even be greater if fish prices are lower. However, interest and commitment to manage the fisheries do not seem to grow in tandem. In the field, on the ground, very little management is visible. It is business as usual, whether on shore or in the sea.

In fact, the appetite for responsible management of the fisheries has declined since the Code of Conduct for Responsible Fisheries was first introduced in 1995. After a flurry of activities in the name of responsible fishery in the early years of the Code, not much has happened.

Everywhere, fish catch is declining, and fishers are struggling to cope. Fisher incomes may have increased at times, from higher prices stemming in part from growing global appetite for fish. But after more than 10 years since the Code of Conduct was brought into being, management activity is still largely confined to talks and Power Point presentations. If any 'management' activity goes beyond the four walls, it is only for a field trip or quick visit to a site where the management process is stage-managed.

Even at the international level, interest in management matters has declined just like the fish landings. So has commitment to management. At best, half-hearted old measures are repeated. No imaginative and exciting initiatives are in the works or on the drawing board.

After the early excitement and enthusiasm for the Code of Conduct for Responsible Fisheries, we have hardly started to walk the talk on responsible management.

But BOBP and ***Bay of Bengal News*** ought to continue the crusade for fisheries management. Who knows, there will be better times, and we will actually see some action.

– Kee-Chai Chong
(Director of BOBP from 1995 to 2000, now a Consultant)

Bay of Bengal News, a boon for extension workers

This incident happened around 1993. The Collector of East Godavari District, who was reviewing the performance of different line departments, suddenly turned to the officer in charge of fisheries and asked him, point-blank: "So where do we stand with the FADs?"

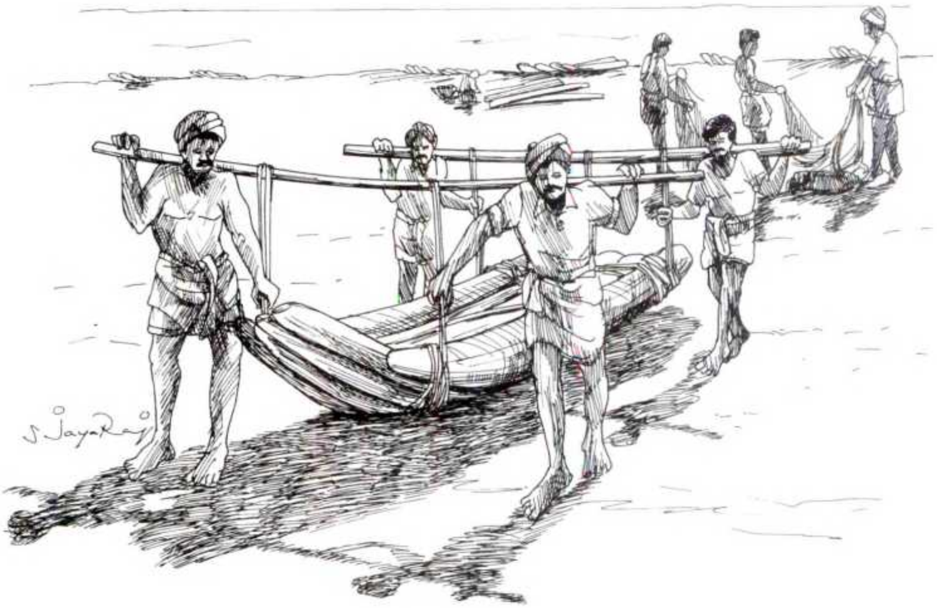
The officer was taken aback – it was too sudden and, frankly, he had no idea what FADs were and where the District Collector had picked them up. It was a time few people even in the fisheries department had heard of the fish aggregation devices or what they were supposed to do. Fortunately, the Collector was in a good mood and actually took the trouble to explain to the hapless junior bureaucrat that he'd read about the FADs in an issue of the ***Bay of Bengal News*** while he had been working in another coastal district and the article had stayed in his memory all this time. "Do you think you could get me a copy of the BBN that carried the article so I can read it again?" he requested the fisheries officer.

The officer assured the Collector that he would do his best and, knowing that I maintained a collection of the BOBP publications, rushed to my office at the conclusion of the meeting. His first comment when he saw me was, "Did you know that the Collector has a fad for FADs, whatever they are?" He borrowed the relevant issue of BBN and read the article carefully, complaining, "Who knows what he might ask next?" before going back to the Collector's office waving the newsletter like a prize trophy!

My association with the BOBP had started even before ***Bay of Bengal News*** came into existence. I had been working since May 1980 with a team of specialists. We were involved in designing, developing and testing the prototypes of a new batch of beachlanding crafts (which would eventually give rise to the IND-20 and its other variants that would become so common along the east coast of India over the next decade) when I received my copy of the first issue of the ***Bay of Bengal News***.

I remember I flipped through its pages rather casually, assuming it to be one of those 'in-house' publications given to self-promotion and gave it no further thought at the time. It was only with the second or third issues that my curiosity was stirred and I realised that the ***Bay of Bengal News*** was no run-of-the-mill journal – it had a sharp focus on small-scale fishers and their livelihood issues. It was pleasantly surprising to see the BBN devoting many pages in each issue to discuss the diversity and complexity that characterise life in a fishing community, aided in no small measure by magnificent black-and-white photographs as well as even more beautiful illustrations that would come to be recognised as 'BOBP Art' – so top-class that they remain unmatched to this day.

Naturally, it took the magazine a very short time to reach all levels of administration in Andhra Pradesh – from the Principal Secretary to the Government right down to the fisheries field personnel in the remote coastal villages – encompassing *en route* the District Collectors, the district-level officers of fisheries, rural development and other line departments, financial institutions as well as research and academic institutions.



The elegant and thoughtful layouts, and the many photographs and illustrations, made the pages easy on the eye. Additional incentives like the lack of distractions (such as advertisements) meant that it was soon competing rather successfully against the few commercial fisheries journals we had in the country. It was not unusual for District Collectors to prepare themselves for a meeting with a visiting expert by quickly going through some back issues of the BBN. I can vouch from personal experience of not only being there when this happened, but of also being the supplier of the relevant journals myself. It was sometimes difficult to get the magazines back, but I was no stickler for protocol when it came to retrieving my precious collection.

The BBN covered most important developments concerning fishing crafts, gear, aquaculture, fishery resources, fishermen and their socio-economics, all of which were quite vital for development policy making and implementation, so it almost became compulsory reading for everyone in fisheries. True, the other publications of the BOBP provided more exhaustive and detailed information on various issues, but ***Bay of Bengal News*** provided chunk-sized bytes of easily-digestible information that went down well with the non-'fishy' types in the administration.

For the 'fishy' bunch, which included me, the importance of the BBN also lay in the fact that it was helping us to upgrade our knowledge on different issues and taking us into new and as yet uncharted territories like fisheries management, coastal aquaculture and, perhaps most significant of all, the socio-economic spheres of life in fisheries.

The energy that the BBN developed through the 1980s seemed to have been dissipated by the early 1990s. There was a sizeable reduction in the number of people receiving the newsletter, probably due to funding constraints. It continued to come out regularly, but its reach was confined to a much smaller circle of people and those who had been left out were justifiably upset. I was one of the casualties of the 'cull'.

If you had been a frequent reader of a particular journal that suddenly decided to fold up or refuse to send you your copy, you'd understand how I'd felt. I find the need to read many of the back issues of the ***Bay of Bengal News*** even now, for professional reasons as well as out of nostalgia, and I do seem to find them more valuable with each reading. Once again, it is on the nostalgia front that the other publications brought out by the BOBP cannot beat the BBN, which remains a magnificent collation of people, events, things, projects and so much more that made life look so exciting and interesting!

Anyway, it is my fervent hope and desire that, as it enters the 26th year, BBN will reach out to new readers and provide them with the same information-edge that people of my generation received from it.

– S B Sarma
Assistant Director (Retired)
Department of Fisheries,
Andhra Pradesh

"Bridging the gap between the local and the global"

The objectives of BBN were to inform fishery specialists, administrators and laymen about BOBP's work, and in this it was quite effective. Over the years there have been several interesting articles in BBN – on the need to ban bottom trawling, on fishermen cooperative societies, on costs and earnings of fishermen in Kerala, on fisherfolk from Phang Nga Bay in Thailand voluntarily surrendering pushnets for gillnets, on the problems faced in Besant Nagar fish market, on issues of shrimp culture on the Indian East Coast, and so on.

BBN has tried to bridge the gap between the local and the global and has carried information on local developments as well as developments at the international level – the Code of Conduct for Responsible Fisheries, international instruments on the safety of fishing vessels, etc. BBN has certainly made for informative reading. It has also carried reports on the various trials undertaken by BOBP to improve fishing gear technologies in the region. Perhaps some of the articles – on beach-landing crafts and high-opening bottom trawls, for instance – were more promotional than informative. It would have been interesting to carry different perspectives on the pros and cons of these technologies.

No doubt a publication such as BBN had an important role, particularly as it enhanced the visibility of small-scale fisheries and their communities, and notably of women in the fisheries sector. It continues to serves as an important reference material on the fisheries in the Bay of Bengal region. It can be effectively used by projects and policy-makers, to learn from past experiences, positive and negative.

– Chandrika Sharma
Executive Secretary,
International Collective in Support of Fishworkers.Chennai

The best and the brightest of *Bay of Bengal News*

Eighty issues of ***Bay of Bengal News***! So many wonderful articles, photographs, layouts. How does one pick the best of them? The criteria for inclusion in this article: articles strong in ideas which have made an impact on our readers; visuals that are striking in terms of creativity, imagination and aesthetic delight. In other words, only what's exceptional and outstanding.

Let me begin with two charming photo essays early in BBN history, fairly novel for fisheries magazines. But both these were cited in the article on BBN history (page 16). The first photo essay was in the second issue (May 1981), on Bangladesh – terrific photographs by Harry Miller. The next photo essay was in December 1981, a selection of photographs from our October 16 photo exhibition held in Chennai. The essay was as much a social statement on small-scale fisheries as on the art and craft of photography. The photo exhibition was a major exercise in public awareness-raising, so was the BBN that reported on it.

The same issue (December 1981) must be rated one of the best ever in BBN – the depth in content matched the visual appeal. It was a Sri Lanka special. An excellent article on Sri Lankan fisheries was illustrated, ingeniously, with photographs enclosed in a map of Sri Lanka. A graphic article on Negombo (with a big two-page spread of Negombo boats under sail), a piece on demersal fisheries by G H de Bruin, and a four-pager on women in Sri Lankan fisheries – every piece a little gem.

The fifth issue (March 1982) was also a champion. Its highlights; picturesque coverage of the Bay of Bengal Committee inaugural in Colombo; a Q & A interview with John Kurien about the Kerala costs and earnings study carried out for BOBP by the Fisheries Research Cell ; a four-pager on sails with a splendid breath- taking double-spread sketch on sails; and visually innovative articles on women's projects and on "Planning from below in Adirampattinam."
(The bottom half of the two-page spread was an eye-stopper: a group of fisherfolk bicyclists shot against a village backdrop, across a pool of water that reflected their images.)

The March 1983 BBN carried a poignant two-page photograph of fisherwoman Tillai and two of her children. Rarely has the mood of despair and fatalism in a person's face been captured with such stark realism. It was part of an article on the poverty of a typical fishing family.

The July 1983 issue had three of the most imaginative photo creations a fisheries reader would have come across. For the first, the artist cut out the word "Killai" from the photograph. It can't be described, take a look at the cover of the July 1983 BBN. The second was a panoramic presentation of the Killai pen-culture project, assembled from half a dozen photographs by artist-cum-photographer E Amalore. The third picture was referred on page 18.

This issue also contained an important pictorial report. Heading: "All the BOBP's men (and women) – hundreds of them!" The message: Though only a couple of dozen staff worked at BOBP in Madras, as many as 4 000 people took part in BOBP's work at that time: in fishing villages, beaches, boatyards, fish ponds, pens and cages, out at sea. These included boatbuilders, net-makers, mechanics, welders, labourers, social workers, extension workers, government counterparts, fisheries experts.

The September 1983 BBN presented a few splendid visuals. The article "Bay of Bengal Committee meets in Madras" silhouetted a xerox image of the Mahabalipuram shore temple against the horizon as a symbol of Tamil Nadu; the text was reversed in white on a black screen. An article on "tree fishing" in Tamil Nadu carried an unforgettable picture of a huge tree branch being taken to the sea on a kattumaram. In fact Harry Miller, who shot that picture, asked us what these fishermen were doing with that tree. We got two Tamil Nadu fisheries officials, S Pandurangan and P V Ramamoorthy, to describe the use of tree branches as an FAD.

The December 1983 BBN featured a cover package on sail power, reportage on a sail consultation and a sail contest, with sketches of different types of sails. The Gunter rig was the winner for medium-sized boats (sail area of 20 to 30m^2) and large boats (30m^2).

The March 1984 BBN came in for high praise from FAO Rome. It should be considered one of the strongest BBN issues of the first BOBP phase – thoughtful and provocative articles on varied subjects: the success with bank credit for Orissa fisherfolk; the experiments in Sonadia island; jewfish export from Cox's Bazar – a comprehensively illustrated feature on a major enterprise in Bangladesh that began as an act of serendipity.

The June 1984 BBN cover story "When foxes entered a shrimp pond," with a sketch of two foxes, was one of the most widely read stories in BBN! It was about BOBP's shrimp culture project in Polekurru, Andhra Pradesh. Another popular story: A six-pager by Swedish artist Signar Bengtsson, a votary of sails, with nine interesting sketches of traditional craft under sails. Also significant was a story on BOBP's effort in Bangladesh to raise the incomes of women from fishing villages.

The September 1984 BBN had an outstanding visual to illustrate an article that profiled Angalamma, a fisherwoman. A double-spread photograph of her carrying a basket of fish was silhouetted against the landscape. The same issue also carried a six-page article by director Lars Engvall analyzing the impact of BOBP work. He discussed four types of impact – negative, negligible, positive, potential. A third notable article was on fish stock assessment by Daniel Pauly.

The September 1986 BBN carried an excellent analytical article by Arne Andreasson on "Ensuring effective follow-up to BOBP pilot activities". The December 1986 BBN, a special on "people's participation," has been discussed on page 19. The March 1987 BBN contained a cover package on shrimp culture that was featured by an FAO Rome publication that highlighted newsletters. (See page 18.) The March 1988 BBN carried the insightful article "No easy solutions for set bagnet fisherfolk", based on a study by five national fisheries staffers. The June 1988 BBN focused on Malacca Straits – with articles on extension activities in the Ranong project, Thailand; oyster culture, Malaysia, and fisherfolk credit, Indonesia. This issue also reported on a Swedish "minor field study" project about the marketing of beachcraft catches in Puri, Orissa, with action photographs from Delhi, Calcutta and Puri, and a much-in-demand full-page sketch tracing the flow of beachcraft catches from Puri to various destinations.

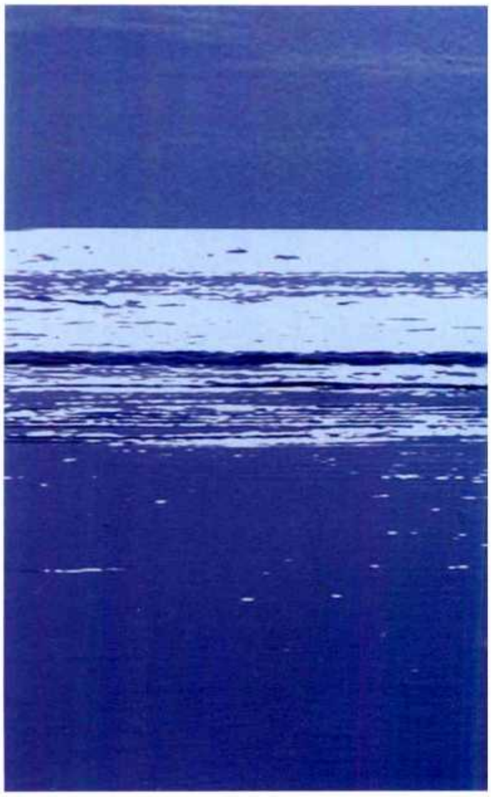
In the September 1988 BBN, the cover package on " Safety at Sea" highlighted the experiences of Sri Lankan fishermen who had drifted to Indonesia. Consultant Urban Hallberg discussed the action Sri Lanka needed to take on many fronts to ensure safety at sea. Post-harvest technology was the cover package in December 1988 – articles on use of ice in Andhra Pradesh and Sri Lanka, fish smoking in the Maldives, discard of shrimp by-catch at sea.

The last page of the June 1989 issue – an obituary of Antony Raja – inspired comment from far and near. In the September 1989 BBN, a significant article compared offshore tuna exploratory projects in Sri Lanka and Maldives.

Fisheries management had started becoming a serious issue, and the December 1990 BBN featured a cover-story interview with Dr Armin Lindquist, FAO's Assistant Director-General of Fisheries, "Management is the only solution". A lovely four page photo feature on extension activities in Bangladesh was another highlight.

The June 1991 BBN carried a cover feature on "The life-giving death-taking waters of Bangladesh" by S Muthiah, his first issue as editor. (He edited the next 12 issues as well.) He discussed the horrors of the April 1991 cyclone which killed more than 150 000 people and wrought havoc to the fisheries sector worth $130 million. The September 1991 BBN carried a photo feature on boats in Nias island, Indonesia, and reports on BOBP's radio project in Sri Lanka.

An interesting fish marketing profile of a bicycle fish trader in Sri Lanka was one of the highlights of the June 1992 BBN. Extension activities and a bio-socio-economic study of set bagnet fisheries, Bangladesh, were other significant articles. Pelagic sharks in the Indian Ocean were for the first time the cover focus of BBN in December 1992 – with a cover article on the shark resource by fisheries biologist



K Sivasubramaniam; an analysis of shark fishing in the Maldives by R C Anderson and Hudha Ahmed, an article on shark longlining on India's east coast by Thomas Dahlgren, and a report on shark fin trade in the Bay of Bengal.

What's the effect of the marine environment on fisheries in the Bay of Bengal? This was discussed in the March 1991 BBN by Swedish environmental adviser Staffan Holmgren. Also in this issue, studies on the killing of dolphins in Sri Lanka – showing that only 5 200 dolphins a year were killed, not an alarmist 60 000 – were analysed by Leslie Joseph and Pauline Dayaratne.

The June 1993 BBN discussed 50 issues of BBN, an important article on research needs for fisheries management by K Sivasubramaniam, and an analysis of new outrigger canoes in Sri Lanka by G Pajot. BOBP's brilliantly researched and presented comic book "Our fish, our wealth" was evaluated by Rathin Roy in the September 1993 BBN. "Can trickle-down economics work in the shrimp culture industry?", asked Charles Angell.

The December 1993 BBN was a landmark – a farewell letter from publisher Lars Engvall, plus a cover feature "A new approach to fisheries management" with an imaginative cover sketch on bio-socio-economics and a package of articles inside. Leslie Joseph analysed the prawn culture boom in Sri Lanka while Charles Angell revisited Polekurru, Andhra Pradesh – a picture far different from the one about a decade ago.

The Management Phase

The management phase of BOBP began in 1995. BBN was no longer "crowded" with people, events and activities as in earlier phases. Its articles in this phase were contemplative. Many creative sketches adorned the pages of BBN, since management does not lend itself to photographs.

A sampling of the many articles on management in various issues of BBN: "Responsible fish consumers can strengthen fisheries management," by Kee-Chai Chong (June-September 1996). "Unresolved and new issues in fisheries management" by Kee-Chai Chong and John Kurien (March 1997). "Reef resources management in the Maldives" (March 1997 BBN); "Coming together to manage fisheries" by Rathin Roy, a Q & A article on the stakeholder approach to fisheries management (June 1999); "Fisheries and aquatic resources management: lessons not learned yet" by Kee-Chai Chong (September 1999).

The theme of stewardship in coastal zone management inspired a superbly imaginative cover design in the June-September 1996 BBN. Sketches showed how fishermen, tourists, consumers, fisherwomen, administrators, donors and middlemen could together help stewardship. This issue contained an article by 13 authors – a record for BBN. It was on "Regional stewardship for sustainable fisheries and food security." A colourful two-page photo feature highlighted "Issues and solutions in fisheries management" – the BOBP projects in member-countries.

The December 1996 BBN was much acclaimed within and outside the region for its splendid coverage of ornamental fisheries (See page 24). This issue also contained a lovely photo feature on "Income options for women in Bangladesh fishing communities". Another photo feature followed in the March 1997 BBN: by S R Madhu on "Community-based fisheries management in Phang-Nga bay, Thailand".

Shrimp culture was the theme of the September 1998 BBN: articles by M Sakthivel of the Aquaculture Foundation, John Kurien and Charles Angell (who wrote about the plight of shrimp farmers in Andhra Pradesh). There was also a case-study of the CMFRI and an interview with a shrimp exporter. Shrimp was again the focus of a cover package in March 2000. Marine parks of Malaysia were highlighted in the December 1998 BBN.

The March-June 1999 BBN contained a first-of-its-kind report on the visit to Chennai of FAO Director-General Jacques Diouf.

The people behind *Bay of Bengal News*

The following were the main ***dramatis personae*** behind the 80 issues of BBN from 1979 to 2006.

1. Lars Engvall – the first publisher (1979-1994).
2. S R Madhu – the first editor (1981-1991) & consultant (1996 - till date).
3. E Amalore – the first artist, also an engineer, a draughtsman, a photographer (1981-1994, 1996-2000).
4. Vijay Kumar – video specialist and photographer (1988 - 1992).
5. S Jayaraj – artist, photographer and video cameraman. (1985 - 1994, 2001 to till date).
6. S Muthiah – the second editor (1991-1995).
7. Rathin Roy – extension specialist, regular contributor to BBN (1987-2000).
8. Kee-Chai Chong – publisher-cum-editor (1995-2000).
9. Y S Yadava – publisher-cum-editor (2000-till date).

Nagaraj & Co have printed all issues of ***Bay of Bengal News*** except those during the third phase of BOBP (1995-2000). Its managing director M S Nagarajan has been a keen enthusiast of BOBP.

There was also a cover package on the Code of Conduct for Responsible Fisheries, the first of many, with articles by Dr Y S Yadava and John Kurien. The September 1999 BBN reviewed a book by Dr K Sivasubramaniam on 100 years of fisheries management in Sri Lanka. The December 1999 and Jan 2000 issues discussed "Documentation of learnings" from the management phase of BOBP, result of a two-member mission (Gary Preston and Y S Yadava) that reviewed BOBP activities in member-countries.

The first BBN issue under Dr Yadava's editorship, September 2000, discussed a Workshop on the Code of Conduct. The keynote address by Mr N K Sinha, GOI Secretary, was reproduced, along with articles by John Kurien, Sebastian Mathew and Kee-Chai Chong. The December 2000 BBN analysed the management of push net and set bagnet fisheries in Bangladesh.

BBN during the first six years of the new millennium has had an awareness-raising and educational orientation. Safety at sea has been featured several times (March 2001, June-September 2001, December 2005, March 2006). The eye-catching batik painting of Sri Lankan fishermen on the cover of the March 2001 BBN aroused great interest. Well-attended workshops on the Code of Conduct for Responsible Fisheries held in Chennai (September 2000 BBN), Dhaka (Jan 2002-March 2003 BBN), Malé (September 2004 BBN) and Colombo (December 2005 BBN) generated detailed coverage. Fisheries profiles have been published for east coast states of India, and for Bangladesh, Sri Lanka and Maldives. There have been two reviews of BOBP work (December 2000, January 2002-March 2003, the present issue discusses 25 years of BBN) to summarise the lessons of the past. The tsunami and measures for rehabilitation have been analysed.

BAY OF BENGAL NEWS
Safety at Sea for Fisherfolk

Fishing with shore seine in Sri Lanka

Two lovely photo features illustrated the BOBP-IGO's art contests for children on "Life after the tsunami" in Tamil Nadu and Maldives (September 2005) and Sri Lanka (December 2005). The enthusiasm and energy displayed by the children were expected, but the quality of their paintings, and the maturity and thoughtfulness they displayed, was indeed a revelation. A photo feature on Sri Lankan fisheries after the tsunami was another highlight of the December 2005 BBN. The present issue of BBN discusses the work of the CIFE, Mumbai. This is the first of a series of articles on "Know your Institution" about leading fisheries institutions of member-countries.

The subject orientation of BBN has changed, but the passion, the commitment, the striving for excellence goes on.

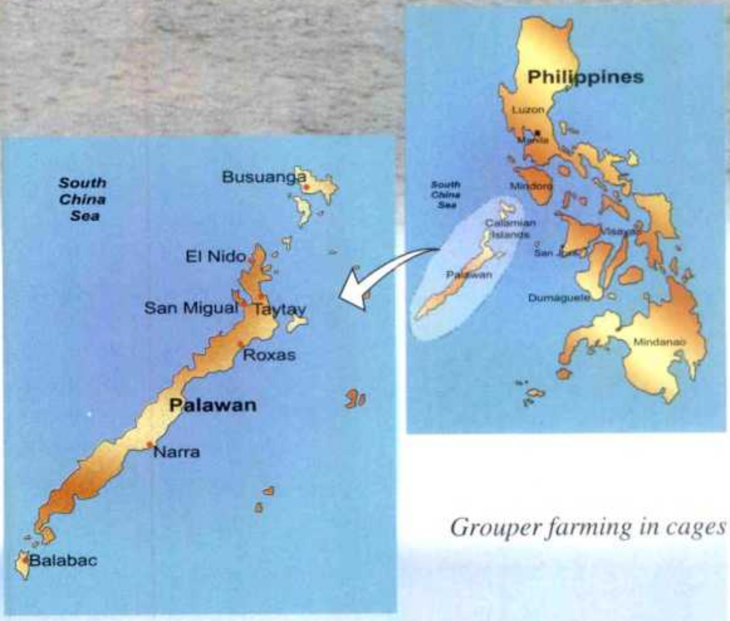
– S R Madhu

Managing coastal resources: Communities in the Philippines show the way

Many success stories in coastal resources management (CRM) have been reported from the Philippines, with communities taking the lead. In a country of 7 000 islands and a coastline of 17 460 km, sustainable management of coastal resources is vital. The principle of CRM has been institutionalised in laws at the national, provincial and municipal levels (see Boxes 1 & 2 on page 38).

Palawan, the largest province in the Philippines, presents an impressive success story in CRM. It is the Community-based Marine Sanctuary Management and Livelihood Support Project, implemented by the community in Caramay, Roxas municipality.

Palawan is a narrow archipelago of 1 700 islands and islets. It is sandwiched between the South China Sea on the western side and the Sulu Sea on the eastern side. Known the world over as the last ecological frontier in the Philippines, Palawan province is


Philippines
Luzon
Manila
Mindoro
Calamian Islands
Visayas
San Jose
Dumaguete
Mindanao
South China Sea
Palawan
South China Sea
Busuanga
El Nido
San Migual
Taytay
Roxas
Palawan
Narra
Balabac

Grouper farming in cages

Members of the Caramay Producers Cooperative

Box 1: CRM benchmarks in the Philippines

- Multi-Year CRM Plan
- Coastal Resource Assessment
- CRM-Related Organizations
- Annual CRM Programming and Budgeting
- Shoreline/Foreshore Management
- Best CRM Practices being implemented:
  - Local Legislation
  - Municipal Water Delineation
  - Coastal Zoning
  - Upland/Watershed Management
  - Mangrove Management
  - Fisheries Management
  - Solid Waste Management
  - Marine Protected Areas/ Marine Sanctuaries
  - Coastal Law Enforcement
  - Coastal Environment-Friendly Enterprise Development
  - Revenue Generation
  - Multi-Institutional Collaboration for CRM

Box 2: Key players in coastal resources management in the Philippines

National Government

(Central, regional, and provincial offices)
Department of Environmental and Natural Resources (DENR)
Bureau of Fisheries and Aquatic Resources (BFAR)
Department of Interior and Local Government (DILG)
Philippine Coast Guard (PCG)
Philippine National Police (PNG- Maritime)
Philippine Navy (PN)
Regional Development Council

Municipality

Mayor
Vice-Mayor/SB
Municipal Planning and Development Officer (MDPO)
Municipal Agriculture Officer (MAO)
Municipal Environment and Natural Resources Officer (MENRO)
Municipal Coastal Resources Management (CRM) Office
Municipal Fisheries and Aquatic Resources Management Council (FARMC)
Integrated FARMC
Municipal Development Council
Private Sector
NGOs
Academe

Province

Governor
Vice-Governor
Provincial Planning and Development Officer (PPDO)
Provincial Agriculture Officer (PAO)
Provincial Environment and Natural Resources Officer – Local Government Unit (PENRO-LGU)
Provincial CRM office
Provincial Development Council

Barangay (Village/ Township)

Barangay Captain
Barangay Council
Barangay FARMC
Bantay Dagat/Deputized Fish Warden
Fisherfolk Associations
People's Organization

rich in both terrestrial and marine natural resources. Its coastline stretches almost 2 000 km, indented by numerous coves and bays. Its pristine waters provide some of the best fish varieties and the fish landings (Box 3). In recent years, seaweed and pearl farming have been encouraged – as well as mariculture to prevent depletion of fishery resources.

The Community-based Marine Sanctuary Management and Livelihood Support Project

The Project is supported by UNDP/ GEF/RNE/SGP and implemented by the *Maliliit Na Maningisda Ng Caramay Producers Cooperative* (MMCPC). It aims to tackle the pressing problem of declining fish yield/ fish catch of marginalized fishermen in Caramay, Roxas, brought about by the destruction of marine resources resulting from illegal fishing, overfishing and the intrusion of commercial fishers into prohibited zones. The project adopts an inter-sectoral approach with a strong focus on sustainable livelihoods. The six project components: (1) marine sanctuary establishment and improvement (2) mangrove conservation and management, (3) patrolling and law enforcement (4) community strengthening/IEC/advocacy (5) capability-building and (6) livelihood support.

Box 3: Profile of fisheries sector in Palawan

Fishermen and Fishing Boats

Commercial Fisheries		
Fishermen	-	3 541
Boats	-	186
Municipal Fisheries		
Fishermen	-	66 773
Boats (Total)	-	15 259
Motorized	-	7 780
Non-motorized	-	6 752
Others	-	727

Fish production during 2005 (in metric tonnes)

Commercial fisheries	-	23 142 (1 135 222)
Municipal fisheries	-	1 04 257 (1 132 120)
Aquaculture	-	104 (1 895 793 including seaweeds)
Total fish production	-	1 27 503 (4 163 135)
Seaweed production (Fresh weight)	-	3 53 115

** Figures in parentheses denote total production in the Philippines during 2005*

Marine sanctuaries, patrolling and law enforcement:

A 50-hectare area has been delineated for the marine sanctuary with perimeter mooring buoys. The setting up of the sanctuary and regulation of fishing will help regenerate resources and increase fish yields within and outside the sanctuary. Two monitoring stations have been established in strategic areas for monitoring, patrolling and surveillance activities. Patrol boats and communication equipment have been installed and made operational. Four-sanctuary guards/ fish wardens have been appointed for daily monitoring and patrolling.

Mangrove conservation and management

Community-based mangrove rehabilitation and management is being undertaken. Ecological camping by youth is being encouraged. So far 90 000 mangrove seedlings have been planted in a 9-hectare area in Tabuyo, Caramay. The community has taken active part in planting and monitoring. Boy and girl scouts in the Roxas Southern District were active participants. The Local Government Unit and the Bureau of Fisheries and Aquatic Resources assisted in the programme.

Marine sanctuary livelihood support activities

Activities include grouper farming in cages, lobster culture, sea cucumber (Balatan) culture, siganid culture, livestock feed production and fish processing.

Community strengthening, capacity-building and advocacy

Activities carried out include training in fishery law and enforcement, biodiversity conservation, coastal resources management, organisational development and management, cooperative development, financial management, mariculture and livestock feed formulation.

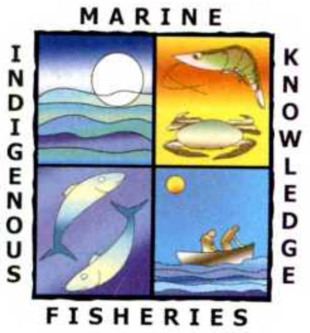
Coastal eco-tourism

The aim is to develop sustainable livelihoods and to conserve biodiversity by enhancing public awareness about coastal resource protection and management. An attractive wide-ranging eco-tourism package of one or two days offered by the cooperative includes:

- Orientation on project activities.
- Island-hopping in Reynard Island, North and South Isle Verde and Puntod Sand Bar.
- A special attraction is the delectable seafood (grilled fishes, steamed lobster and crabs) at the Puntod Sand Bar.
- Balsa rides for snorkeling and swimming.
- Beach walks – particularly the beach between Caramay River and Inindian River, and the beach at Puntod Sand Bar.
- Identification of shells, sea grasses, other marine species in special gleaning areas.
- Guided paddle boating, kayaking, hook and line fishing in multiple use zones.
- Homestay services and socio-cultural interaction with the community.

(This write-up is based on the visit to Palawan by Dr Y S Yadava in July 2006. The visit was part of the International Cooperative Fisheries Organization's Training Project for Promotion of Community-based Fishery Resource Management by Coastal Small-scale Fishers in the Philippines).

Indigenous knowledge in marine fisheries: "An exciting initiative from the BOBP-IGO"



The BOBP-IGO has initiated studies on Indigenous Knowledge in Marine Fisheries in the member-countries. Here is some basic information about this initiative.

Q: Why should we be interested in indigenous knowledge?

A: Everyone agrees that in the world of development, despite the formidable expertise available today, and the technological wizardry of the 21st century, we have much to learn from the indigenous knowledge that traditional communities have harboured for centuries.

In the Bay of Bengal region, marine fisherfolk hold a rich legacy of indigenous knowledge and traditional wisdom. Many traditional practices are based on sound common sense. They are eco-friendly as well. The FAO's Code of Conduct for Responsible Fisheries also recognises this fact.

Q: So what does the BOBP-IGO intend to do about indigenous knowledge?

A: Quite simply – to research, to learn, to debate, to document, to network. We'll give the process of building a database on traditional knowledge in marine fisheries, the initiative and the momentum it needs. It will be a partnership effort – with NGOs, UN agencies, other development organisations, and of course the fishers of Bangladesh, India, Maldives and Sri Lanka who are member-countries of the IGO.

Q: What process would be used to document indigenous knowledge?

A: The preparatory efforts will include a two-day "scoping workshop", the preparation of case-studies and finally a "writeshop" to document the case studies with illustrations.

Q: Can you explain these two terms – the scoping workshop and the writeshop?

A: In the "scoping workshop" some 15 specialists in indigenous knowledge will discuss the scope of the study – the theme, topics and formats for 50 case-studies. They will also identify the researchers who are to prepare the case-studies. They will agree on a 'prior informed consent' framework for the study, a mechanism of consent by the owners of the traditional knowledge, to the dissemination of this knowledge. In the "writeshop" the case-studies will be presented and critiqued. In co-operation with the authors, the editorial team will draft, polish and finalise the case-studies in an easy-to-read quick-to-absorb style. Artists will do illustrations. Discussion summaries and findings will also be prepared and the document will be ready at the end of the "writeshop".

Q: What exactly will you do after the writeshop, what will come out of your effort, and when?

A: The output will include a publication and a CD-ROM on "Indigenous knowledge in marine fisheries: best practices for fisheries resources management and conservation", which will be distributed widely within and outside the region. The study will help establish a strong network of IK-in-Fisheries practitioners and researchers. ***Bay of Bengal News*** will serve as a networking forum, with regular updates, articles and ideas on IK in fisheries. Feedback either direct or through the BOBP-IGO website www.bobpigo.org will improve the knowledge base.

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation(BOBP-IGO).The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

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Reforming fisheries

Challenges for the millennium

Marine fish stocks worldwide are dwindling, catches are falling, so are the incomes of small-scale fishermen. Fisheries and aquaculture cry out for reform. This issue presents ideas, plans and recommendations for the future. Many of them are not new. What's urgently needed is action by policy-makers.

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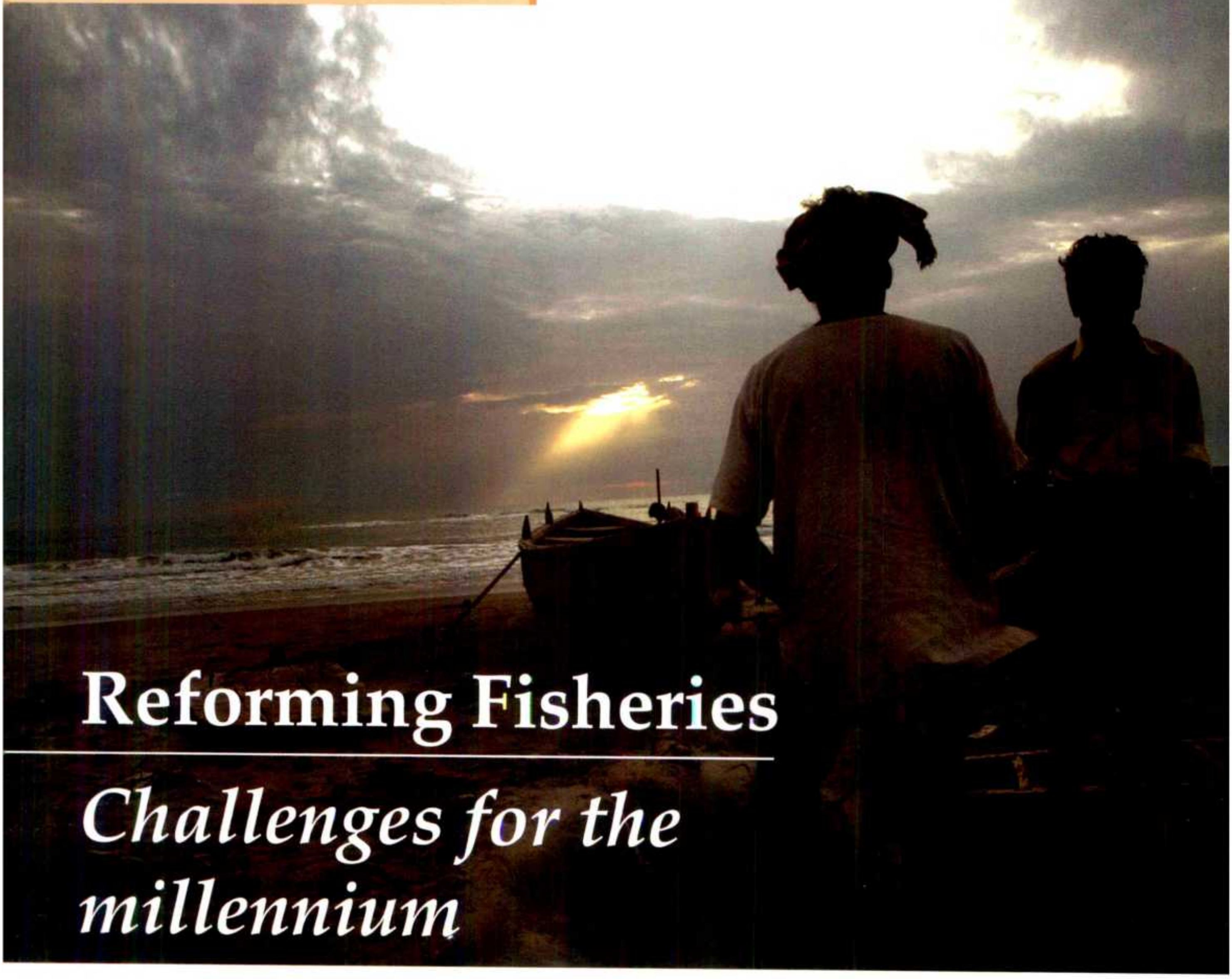
SRI LANKA
SRI LANKA



Reforming Fisheries

Challenges for the millennium

Fish stocks are depleting and degrading because of over-exploitation, but fishers, entrepreneurs and policy-makers seem indifferent to the alarm bells on resource exhaustion. Bay of Bengal News looks at the crisis and at reforms needed in fisheries and aquaculture to resolve it – as analysed at several expert fora.

The world will run out of seafood by 2048 if marine fish stocks continue to decline at current rates, a group of 14 researchers have warned in the journal ***Science.***

Overfishing, pollution and other environmental sins have made fish stocks round the world plunge. In fact, marine catches have been declining since the early 1990s. And alarmingly, smaller sizes dominate the catches of most of the species, while higher-value species have given way to low-value/ trash fish. With the market for seafood expanding, the pressure on resources is getting ever more severe. The collapse of commercial fisheries could devastate the world economy — the fishing industry generates $80 billion a year, more than 200 million people depend directly or indirectly on fishing, seafood is the main source of sea protein for a billion people worldwide.

The study by the 14 researchers is based on nearly three dozen controlled experiments and a critical analysis of the FAO's worldwide catch data from 1950. Ecosystem records going back a thousand years were also researched — including sediment cores and archival data. In 12 marine ecosystems surveyed, the researchers found that a decline in biodiversity of 50 percent or more cut the number of viable fisheries by 33 percent, reduced nursery habitats by 69 percent, cut the ocean's capacity to filter and detoxify contaminants by 63 percent.

Fortunately, the findings have a positive side too. In nearly 50 areas where restrictions had been imposed on overfishing, the range of species in the water increased on an average by 23 percent within five years. This means sound management can halt the decline of fish stocks worldwide. The study concludes: "It's not too late to turn this around. It can be done, but it has to be done soon."

Let's look at the Bay of Bengal region. India's marine fish production during the last 15 years (1990-91 to 2004-05) has been fluctuating between 2.3 and 2.99 million tonnes. The Maximum Sustainable Yield (MSY) revalidated in 2000 is 3.921 million tonnes, of which 2.280 million tonnes is available in the coastal waters and the remaining in the offshore areas of the EEZ. It is believed that coastal waters are already overexploited by about 0.3 - 0.6 million tonnes per annum. In offshore waters, there is additional catch potential of about 1.0 million tonnes (but details of species abundance are less known for offshore than for coastal areas; some definite information is available only for tunas and tuna-like species.)

Compound growth rate in the marine sector fell in the 1990s to 2.19 percent from the 3.99 percent achieved in the 1980s. Qualitative aspects of marine landings during the last one decade are even more disturbing. Some demersal varieties like shrimp have declined in stocks and fallen in average length and weight. The prized shrimping grounds of the northeast coast (Sandhead area) are almost barren today. The average sizes of ribbon fish and pomfrets are almost one-third of what they were in the last decade. If the same trend continues, the stocks might be wiped out in another decade.

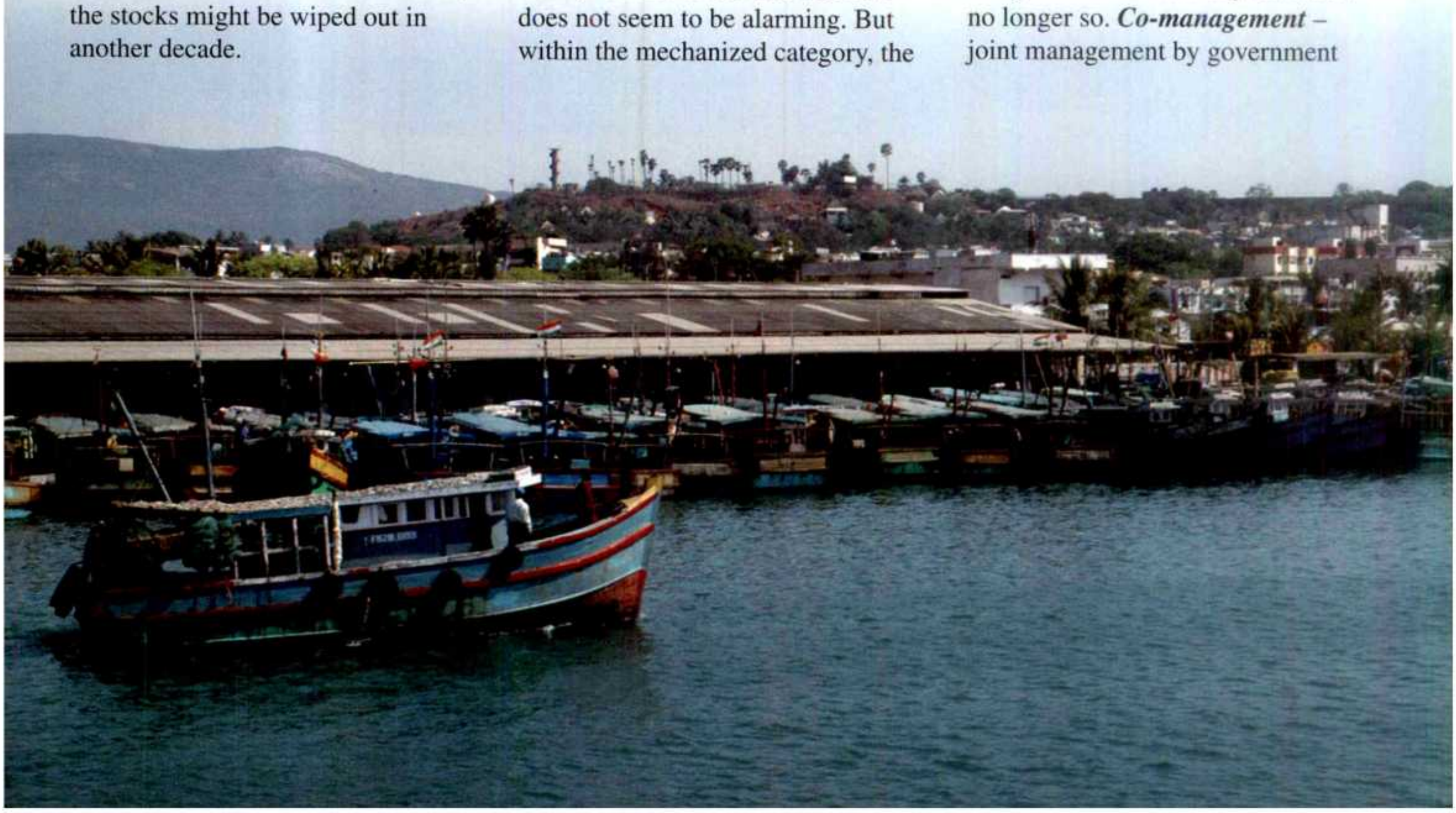
What has led to this situation? Let's take India's mechanized fishing fleet of trawlers, purse-seiners, gillnetters and dol-netters. It has grown almost four times in 25 years – from 14 854 in 1980 (CMFRI census) to 58 911 in 2005 (CMFRI census). The traditional fishing fleet (including motorized boats) increased more moderately, by 1.4 times — from 134 741 in 1980 to 179 861 in 2005. During the same period, marine fish production increased only from 1.555 million tonnes (1980-81) to 2.960 million tonnes (2004-05). The 400 percent increase in the mechanized fishing fleet seems to be the main cause of overexploitation of marine resources.

In Sri Lanka, the estimated annual marine fish yield potential is said to be 250 000 metric tonnes (according to a 1978-80 survey conducted by RV Dr Fridtjof Nansen). Take actual marine fish production for the last 6-7 years. The potential yield seems to have been exceeded by about 15 to 45 thousand metric tonnes. What about the catch effort? The total fishing craft in Sri Lanka rose from 28 585 in 1981 (12 870 mechanised and motorized boats, 15 715 traditional boats) to 31 619 in 2004 (16 359 mechanized and motorized boats, 15 260 traditional boats). On the whole this increase does not seem to be alarming. But within the mechanized category, the FRP boats doubled in number from 5 738 in 1981 to 11 559 in 2004. These are day boats with outboard motors fishing in coastal waters. They are largely responsible for the resource overexploitation.

The examples of India and Sri Lanka clearly illustrate the point that unregulated access and unbridled mechanization and motorisation of traditional craft have led to overexploitation of resources. Developments in gear technology have further accelerated the problem.

What is the solution? ***Reduce fishing capacity*** – that should be the No.1 task of countries with an excessive fishing fleet. Even where stock assessments have not been carried out or where resource information is outdated, the "precautionary principle" should rule and the fishing fleet should be cut. Simultaneously, ***develop management plans for all commercial fisheries*** so that harvests are scientifically regulated. This may be politically sensitive issue, but sooner or later the reality has to be faced. Better to do it sooner and save fishery resources from collapse.

Tackle the issue of access to fisheries. Is it okay for anyone and everyone to fish with any craft? It's no longer so. ***Co-management*** – joint management by government



and local communities – is a good way to address this issue. Governments at both national and provincial levels should give high priority to co-management plans and action. So should NGOs and fishery associations. ***Ensure better monitoring, control and regulation of the fishing fleet and fishing gear, implement closed areas and closed seasons, protect nursery areas, create fish refugia*** – these would be other important measures.

Post-harvest losses, especially in tropical fisheries, mean far fewer fish for human consumption. No precise quantitative figures are available. But the ***quality*** of fish at landing centers leaves much to be desired. Discards of fish is another serious problem. Example: the industrial finfish and shrimp trawl fisheries of Bangladesh, which throw away sizeable quantities of low value fish. ***Conduct pilot-scale demonstrations on best practices and impart training to fishers*** to reduce post-harvest losses and discards.

The Code of Conduct for Responsible Fisheries (or the Code) was acclaimed with hallelujas when the FAO Conference adopted it in October 1995. It was regarded as a panacea for all ills that plagued global fisheries. Subsequently, the FAO developed several guidelines and plans of action to facilitate implementation of the Code. However, 11 years later, the Code is still to reach, let alone influence, grassroots fishers.

Mr Ichiro Nomura, Assistant Director General, FAO Fisheries Department told ***Bay of Bengal News*** in an interview (pages 5 - 6) that communication on the Code is very poor. ***Ensure that the Code is well-known, raise awareness about it, improve implementation*** – this is something the FAO, national and local governments and other agencies should seriously and urgently address.

A holistic approach toward reforms in fisheries would also require sound national policies: ***Remove harmful subsidies, improve hygiene and sanitation and safeguard consumer interests, ensure fishers a safe and healthy working environment, reduce operational expenses, bring down tariff and non-tariff barriers, particularly those that impact on the livelihoods of small-scale fishers, promote regional and sub-regional cooperation for sustainable development and management of fisheries and aquaculture.***

Reforming fisheries was the theme of a regional workshop organised by the Asia-Pacific Fisheries Commission (APFIC) in August 2006 in Kuala Lumpur, Malaysia. APFIC's discussions and recommendations have been covered in some detail in this issue of ***Bay of Bengal News***. (pages 25 - 32) The workshop urged upon member-countries a slew of interventions – reduce the capacity of trawlers and push-netters; improve gear selectivity; introduce more effective rights based management and co-management; protect juvenile nursery areas through refugia/ closed areas and seasonal closure; improve utilization of low-value fish through post-harvest interventions. Ensure better onboard handling, etc.

If one were to name a single challenge in fisheries today, it's about how to reverse stock depletion and check resource degradation. The two trends will become irreversible unless addressed urgently and within fixed time frames. The problem is serious but not insurmountable. Interventions must be multi-sectoral, not restricted to fisheries. Some problems have been caused by players outside fisheries. Industrial pollution is an example. Solutions must be discussed with these players.

Our ancestors passed on to us a legacy of healthy seas teeming with fish. That's how we in turn should pass it on to our descendants – lest they accuse us, quite rightly, of selfish and irresponsible dissipation.

– Y S Yadava

Paintings by school children in India, Maldives and Sri Lanka depicting post-tsunami reconstruction.

Reforming Fisheries: An Interview with Mr Ichiro Nomura

The FAO's Assistant Director-General for Fisheries, Mr Ichiro Nomura, discussed a wide range of issues in an interview with Dr Y S Yadava of the BOBP-IGO on 17 August 2006 in Kuala Lumpur. The interview took place during a meeting of the Asia-Pacific Fisheries Commission's Regional Consultative Forum on "Reforming Fisheries".

Y S Yadava: Marine fish stocks have got depleted in most of the oceans. Over the years, marine fish production has stagnated and resources are under stress. On the other hand, demand for marine fish is expanding, leading to increased effort. How does the FAO view this development?

Ichiro Nomura: We are very concerned with developments in marine fisheries. Most of the fish stocks are overexploited and there are clear evidences of fishing down the food-chain. The reality has to be accepted. We must stem the trend. Fishery resources are not limitless. We can develop new markets of course, but the world can't keep enhancing effort to increase fish production from our oceans. Many fishery resources must recover to Maximum Sustainable Yield levels by 2015 – as resolved in 2002 by the World Summit on Sustainable Development held in Johannesburg.

Depleting stocks reflect poor fisheries management. I concede that the 2015 deadline may be unrealistic, but this should not be a pretext for inaction. It was a political decision and we must act on it. The FAO's Fisheries Department is striving for fuller implementation of the Code of Conduct for Responsible Fisheries to improve the situation in marine fisheries.

Yadava: In marine fisheries, the small-scale sector is very significant player. But this sector is under threat on many fronts. Degradation of resources. Open access which means over-exploitation. Inter-sectoral conflicts. It is large coastal communities, often the poorest of the poor, who are active in small-scale fisheries (SSF). They need more support and larger interventions than before – from governments, from donors, from the FAO. In this context, what are your views on sustainable development of SSF and the role of the FAO?

Mr Ichiro Nomura

Nomura: It is fair to say that the international fishing community and the FAO governing body did not pay enough attention to SSF in the past. The issues were not perhaps addressed quite adequately. This is also a reflection of our agenda setting practice. But from 2003 onwards, SSF has been allotted a separate agenda in the Committee on Fisheries (COFI). It has got the recognition it merits, and we will continue to recognise its importance.

The FAO has served as a catalyst. But an important issue is how SSF can be tackled effectively at the national and local levels. FAO cannot be the main actor in this exercise. The main actors are the fishers and the national governments. COFI sessions can address the issues in the most appropriate way. I will try to see that SSF becomes a standard agenda item in all COFI sessions.

But SSF should not be addressed purely as a fisheries issue. That won't be a good strategy. Since SSF stakeholders are weak, they may lack political support. Their issues should be addressed in the larger

Mr Ichiro Nomura, ADG (Fisheries), FAO, Rome.

Mr Nomura obtained a bachelor's degree in marine biology in 1974 from the University of Tokyo. He also has a master's in international law from the Fletcher School of Law and Diplomacy, Tufts University (1979) and a master's in public administration from the Kennedy School of Government, Harvard University (1980).

He started his career with the Fisheries Agency of Japan in 1974, and was attached to its International Affairs Division. During 1983-86, he served as the Fisheries Attaché in the Embassy of Japan based in Washington DC, dealing with matters such as bilateral fisheries issues, fish trade, import quotas, etc. For a short while, Mr Nomura moved out of fisheries and took part in the Uruguay Round of Negotiations (GATT) dealing with many agricultural commodities including rice.

Returning to the fisheries sector in 1992, he first served as Director for International Negotiations and later as the Director of the Resource Conservation Division and Director of Far Seas Fisheries in the Ministry of Agriculture, Forestry and Fisheries of the Government of Japan. In April 2000, Mr Nomura moved to Rome as ADG (Fisheries).

Mr Nomura spent his schooldays in Kobe and a larger part of his higher education and career in Tokyo.

developmental context. The COFI also believes in this.

Yadava: Do you think a sub-committee on SSF under the COFI can be useful in providing thrust or focus to the sustainable development of SSF?

Nomura: This question is often being mooted. But a standing sub-committee of COFI for SSF may not be easy to set up, institutionally and financially speaking. The two COFI Sub-committees on Fish Trade and on Aquaculture needed a lot of preparatory work and justification before they could be set up. A sub-committee on SSF would require even more justification. The FAO Governing Body should be convinced of the need. In my personal opinion it may not be a very wise strategy. If such a sub-committee comes into being, only countries with an active SSF will be interested, developed countries without an SSF may not be interested. Thus a sub-committee on SSF will unintentionally restrict their participation, this won't help the SSF.

A sub-committee may also be counterproductive to the larger strategy of helping the SSF. Issues concerning SSF should be addressed in the full COFI body in the light of the diversity and vastness of related matters, and if possible even in a much bigger forum where other developmental issues (such as health, education, etc) concerning SSF can also be discussed. I'm sure COFI will retain interest in SSF and address its issues and problems. Any worry that SSF will disappear from the COFI agenda is unfounded. The Secretariat of COFI is very supportive of SSF.

Yadava: SSF contributes substantially to fish production and exports. Can't it be argued that the trade aspect merits the involvement of those countries that do not have small-scale fisheries of their own?

Nomura: It sounds like a forced argument. Some developed countries may not care for SSF as much as you expect. They may not think it as an important business. The fisheries industry, however, may be more concerned. Seafood also faces competition from other sectors (livestock, poultry, etc). I completely agree that the interests of SSF should be protected, and the FAO considers it a very important client. It is in fact our mission to help SSF and we are very attentive to their needs and causes.

Yadava: The Code of Conduct for Responsible Fisheries (CCRF) will be 11 years old in October 2006. The Code is voluntary in nature, but all member- states should ensure its effective implementation in the interest of sustainable fisheries and aquaculture development. It is the FAO that piloted the Code a decade ago and coordinates its implementation even today. Is the FAO satisfied with the implementation of the Code? What needs to be done to accelerate implementation at the grassroots level?

Nomura: We are not at all satisfied with the state of implementation of the CCRF. We don't mean that it is not being implemented at all, but the implementation is far from satisfactory. The Secretariat feels quite frustrated and is struggling hard on the subject of assisting the member- states. The FAO can only play a catalytic role, strengthen training components and act as a forum for awareness raising. It also provides some direct assistance, for example through the FISHCODE Project.

In the last COFI meeting, some members suggested revision of the CCRF and its Technical Guidelines. I personally feel it is not necessary at the moment to make any revisions to the Code itself. The Code is comprehensive and well-drafted. There may be some need for revising Technical Guidelines.

Yadava: Is it correct to say that the present situation is due to lack of awareness of the Code and the need to implement it, among fishers and field-level functionaries of national governments?

Nomura: Communication on the Code seems to be very poor. People in SSF may not even know what CCRF is. On the contrary, they may be implementing many provisions of the Code unknowingly – provisions they do not know about and not highlighted by their governments. There could also be some underreporting on the implementation of the CCRF, and the whole business might be better than what it seems in the reports we receive.

The FAO should help in better communication about CCRF with the help of local and national governments. Efforts in this regard need to be galvanized. At every meeting of COFI, the progress of CCRF implementation is a standard item on the agenda. But this may not be enough. More active implementation and discussion of it may be necessary. Which part of the Code needs prioritization for implementation should be decided at the country level.

Yadava: Do you think a ministerial meeting should be convened in conjunction with the 2009 Session of the COFI to take stock of the implementation of the CCRF?

Nomura: Yes, that's a good idea. We will take note of this suggestion.

Yadava: In conclusion, how do you think regional fishery bodies and inter-governmental organizations can support the FAO in sustainable development of marine fisheries?

Nomura: There are two types of Regional Fishery Bodies (RFBs) – those which are under the FAO umbrella and those that are not. There are also two types of RFBs in terms of different mandates. The first type of RFBs has a mandate from member-states to regulate and monitor fisheries within their jurisdictions. They can directly tackle and implement issues on behalf of their member- states. In other words, they have concrete tools to regulate and monitor. The FAO provides overall guidance to such RFBs if and when requested. It can further improve their coordinating role.

The other types of RFBs, which play an advisory role, are also assisting their member- states in better management of fisheries. The FAO has been convening biennial meetings of the RFBs at the margin of COFI, which have been appreciated by all. We can make these meetings more meaningful.

Increasing safety awareness, overcoming barriers to information

Mats Rosander-Liew, *Swedish Maritime Administration, Sea Safety Council*

Sweden and the Swedish Maritime Administration warmely welcome this seminar on safety at sea for smaller vessels and boats. Some of our experiences may help other countries in their efforts to improve safety at sea.

Different countries face different conditions – cultural, geographical, geological, hydrographical and not least of all economic. These can affect what we do to develop and strengthen safety at sea.

There are no simple or uniform solutions. Safety at sea can be achieved only by strong commitment and collaboration, by joint effort towards a common goal. Better awareness about safety at sea is a very essential first step – it leads to better ability.

We think governments hold the prime responsibility for systems to improve safety at sea. But various interest groups and related industries must be involved as well, and should be encouraged to help out and do their bit. Because safety at sea is complex and challenging and requires the co-operation of all stakeholders.

International co-operation and action are vital. Sweden therefore plays an active role in IMO. It tries to strengthen international instruments and conventions like SOLAS (Safety of Life at Sea). Internally, it does its best to strengthen disaster prevention, through a network of coastal radio stations and warning systems that cover mariners of all kinds including operators of small crafts.

Over the years, excellent co-operation has been developed between the authorities and workers' unions on safety issues and on matters like qualifications of workers, communication, floating devices, etc. There is always scope for improving such co-operation.

Swedish authorities believe that there are principally two attitudes toward safety at sea. Reactive – responding to events that have already occurred. Proactive – characterised by preventive actions

This article is based on the presentation made by Mr Mats Rosander-Liew at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, 1-4 February 2006.

Sweden has 750 000 leisure craft. Three-fourths of all sea-rescue effort in Sweden relate to leisure craft.

on the basis of experience and knowledge, with the development process never allowed to stagnate.

We have achieved success through proactive use of hardware (coastal radio, VHF, SAR, etc.) and software (working with people to increase safety awareness and change attitudes towards safety at sea).

Over time we have reduced the number of serious accidents, including drowning, that occur with both large and small vessels. We have done so by effectively tapping many aids, tools and resources such as:

- Mass media: press, radio, TV and Internet
- Coastal radio stations
- Weather reporting
- Search and rescue organisations
- Waterproof communication equipment
- Floating devices development
- Emergency flares
- Supporting innovations

Safety efforts directed at men – who figure most frequently in accident statistics – are of little use. To change attitudes, we must be unconventional and work with wives and children. Women are more concerned about safety at sea than men. If we involve women more actively with safety at sea effort, there would be fewer accidents. Sweden believes that preventive safety at sea activities must begin with the family.

Methods we have used to reach people with information to increase safety:

- Getting a strong organisation behind us, the Swedish Maritime Administration and the Sea Safety Council*
- Organising campaigns in pre-schools and schools
- Preparing brochures for children and adults
- Preparing Internet materials
- Television for children and adults
- Organising special programmes for special target groups
- Organising seasonal events all over the country
- Mobilising the Sea Safety Council: the Coast Guard, the police, the Swedish Rescue Service Agency, the Swedish Sea Rescue Society, the Swedish Marine Industries Federation, the Swedish Lifesaving Organisation, insurance companies, boating organisations, diving organisations, the guest harbour organisation.

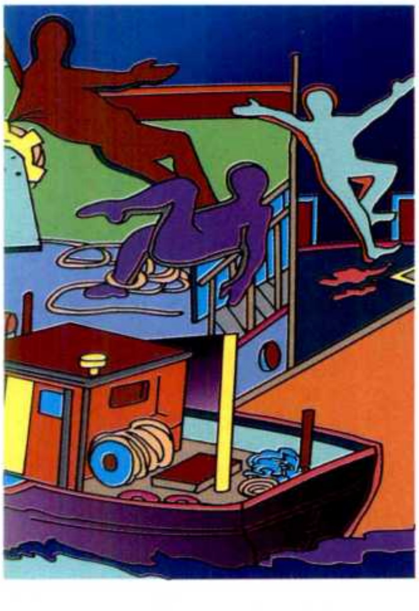
Despite all that we have done, the best of conditions and the best of intentions, a person drowns every third day in Sweden even today. Some 35 people drown every year in leisure-craft related accidents. (More than half of them are men over 50.) Drowning is in fact the most common cause of death among children, after traffic accidents. Only six out of 10 local educational authorities in Sweden follow the curriculum in teaching children to swim. In certain Swedish schools, only two out of 10 pupils can swim 200 metres.

Safety at sea in developing countries

Let me move from safety at sea status and action in Sweden to that in developing countries. May I suggest that a few specific questions be asked.

- For whom, for which target group, is safety at sea a major issue? Who has the responsibility to address it?
- Are safety-at-sea issues for small vessels on the agenda of the relevant committees?
- What responsibilities do states, local and other authorities have for
  - infrastructure
  - legislation
  - control
  - sanctions?
- What is the current status of infrastructure, weather reporting

Left: One of the many posters and publicity materials on safety at sea. Right: Life jackets are worn even while boating in a shallow lake, as a matter of abundant precaution.



systems, wind and cyclone warnings, communication systems, and SAR (search and rescue) systems, for these smaller vessels?

- Is any disaster prevention effort being mounted on the basis of past experiences?
- Is the ability to swim mandatory in schools? Is it as important in coastal areas to be able to swim as it is to read, write and do arithmetic?
- Is there an economic driving force for increased safety at sea, from the perspective of the state, the local authority or any other authority?
- What sort of representation and what influence do these organisations have? Are the control instruments considered to be fair?
- How do these authorities look at issues such as training, equipment, regulation of catches, territorial waters, etc?
- What about the individual fisherman? How can he contribute better to his own safety? How active is his participation? Are there common, accepted, understood strategies, goals and activities? Will anybody listen?
- Is there an economic driving force for increased safety at sea, from an individual perspective?
- What are the negative factors that hinder or inhibit safety at sea?
  - Is the issue regarded as too insignificant economically?
  - Are the people in question, the fishers, regarded as too small and insignificant?
  - Are the fishers un-organised? Is it difficult to establish communication with them?
  - Are safety at sea issues regarded as too expensive to be tackled and solved?
  - Are there ego problems? Do the fishers and fisher groups believe – "We can decide the size of our catches ourselves!"
  - Do they think – "We don't want to be controlled by others"?
  - Does competition among fishers and fisher groups inhibit co-operation and collaboration?
  - Is money an issue? Training, education and equipment cost money. Cost-effective approaches and solutions must be adopted.

How can Sweden help?

a. We can share our experiences on follow-up to drowning cases, and on enabling prevention through media campaigns: print, TV, etc.

b. Share our brochures that contain general information.

c. Support activities to explain safety at sea questions in schools. Help formulate course plans for schools.

d. Work actively with the interface between the product (boat and equipment) and human behaviour.

e. Start and assist pilot projects on safety at sea questions.
- Fishing teams in collaboration
- Education on "sea safety thinking"
- Active Coastal Zone Management (CZM) surrounding these questions
- Other material innovations

Boats, accidents and sea rescue in Sweden:

- 750 000 leisure craft
- Every tenth citizen of Sweden has a boat.
- 90 percent of boats are within sea rescue areas.
- 80 percent always have life jackets for everybody onboard.
- 75 percent of all sea rescue operations (1 000 per year) relate to leisure craft.
- 35 people drown every year in leisure craft- related accidents. The cause is frequently falling overboard in conjunction with fishing alone.
- 100 people a year are seriously injured as a result of leisure craft-related accidents.

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Significant developments have taken place in the global tilapia industry since 2001 when the first comprehensive, business-oriented international technical and trade conference on the species was held. Production of farmed tilapia increased by more than 40% from 1.27 million mt in 2000 to 1.82 million mt in 2004. Meanwhile, landings from capture fisheries rose modestly from 0.68 million mt to 0.72 million mt in the same period. The total production from both capture and culture thus rose from 1.95 million mt to 2.54 million mt, an increase of 30% within a period of just five years. Total farmed production in 2004 alone was estimated to be worth US$ 2.2 billion, up 30% from five years earlier. Major developments have taken place in the form of growing domestic and international markets, introduction of a wide range of value added products, expansion of farming and advances in culture technology. All these, and more, will be discussed in depth at TILAPIA 2007 KUALA LUMPUR, the much awaited follow-up to the 2001 event. The conference will be accompanied by a trade exhibition featuring companies involved in growing, processing and marketing tilapia and providing various inputs and services to the industry. For more information, please see the infofish website.

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FRP boat boom in Tamil Nadu, India

Boatyards in Tamil Nadu, India, are humming with activity. The magic word in fisheries along the Coromandel coast today is FRP or fiberglass reinforced plastic. Kattumarams in FRP are fast-replacing the wooden versions which have dotted the coastline for centuries.

Kattumarams and vallams (canoes) have long been the backbone of traditional fisheries in the state. The kattumaram ("logs bound together" in Tamil) is made up of 5 to 7 logs of *Albizia* wood with tapering ends and tied together. Vallams are dugout boats often constructed with planks stitched to the sides. Both are ideal for the surf-beaten east coast of India. Centuries of evolution had led to craft considered near- perfect for their cost.

The 1980s saw a new trend – motorization of traditional craft – prompted by liberalization of imports and subsidies to promote marine fisheries. Dwindling fish catches in near-shore waters also made traditional crafts venture farther out. Result: kattumarams and canoes were fitted with outboard motors (OBM). Initially, OBMs were considered a boon for these primitive contraptions. But a mismatch between the kattumaram and the motor made fishers look for new hull material. The vibrations of the outboard motor impacted the wooden logs of the kattumaram – they often cracked and broke.

Around this time, Kerala fishermen were taking to FRP as a hull material. The sturdiness of FRP, and the lightness and speed of FRP boats, catalysed a switchover from wooden craft to FRP kattumarams and canoes in Kerala. Tamil Nadu fishermen too were finding wood problematic. Competition for wood from other industries, and deforestation – which led to shortages and price escalation – made traditional crafts too expensive. Construction of new wooden kattumarams and vallams, and replacement of old vessels, was becoming increasingly difficult. The wood-FRP transition took place in Tamil Nadu almost a decade after that in Kerala.

By the mid-'90s, FRP fishing boats had gained ground in Tamil Nadu. Many boatyards sprung up to produce kattumarams and canoes in FRP. Some statistics indicate that by 2004 about 70-75 per cent of the wooden kattumaram fleet in Tamil Nadu had been replaced by FRP.

What is FRP?

Fiberglass is made from extremely fine glass fibers. It is used as a reinforcing agent for many plastic products, the resulting composite material known as glass-reinforced plastic or fiber-reinforced plastic (FRP). It is popularly known just as fiberglass. By changing the chemical composition of the resins and by varying the reinforcements, one may change the properties of finished FRP to suit different applications.

FAO Fisheries Technical Paper 321 provides basic information and guidelines on FRP and its limitations in boat-building. It goes into some detail on the design, construction and planning of FRP boats.

Resins used in FRP

Polyester, epoxy and to a lesser extent vinyl resins are commonly used as the bases for resin systems in FRP composites. Both are essentially thermosetting resins with several advantages:

(a) Relatively high strength/ weight ratio and rigidity as well as good electrical and thermal properties;

(b) Virtually unlimited moulding sizes;

(c) Ease of fabrication using a wide range of manufacturing techniques;

(d) Low capital outlay, particularly for hand layout;

(e) Possibility of one-off or few-off mouldings at reasonable cost;

(f) Design versatility that allows combination with other materials, such as foams for buoyancy;

(g) Resistance to a number of environmental influences, including water absorption, attack by a wide

Typical scene in an FRP boatyard today.

A day in a FRP boatyard

Kanathur lies on the outskirts of Chennai, facing the Bay of Bengal. Once a fishing hamlet, it is today a satellite township of Chennai. Son India is one of the most progressive FRP boatyards of Kanathur. Started in May 1992 with about 40 workers, the boatyard has so far produced more than 2 000 boats. They have been supplied to government agencies, fishermen and NGOs. The yard's production capacity is about 25 boats/ month.

The yard has four FRP and two stainless steel moulds, all designed by the yard. Their quality has improved with experience. During the last decade, the material for the mould has changed from wood to cement to FRP and steel.

The traditional fishing boats most in demand at the yard have the following dimensions:

Model 1: Length 18 - 27 ft, breadth 6.5 ft, height 2.5 ft.

Model 2: Length 26 - 32 ft, breadth 6 ft, height 3 - 3.5 ft.

The materials used to construct FRP boats include mat (including surface mat), roving (including woven roving), resins, catalyst (methyle ethyl ketone), accelerator (for gelling), pigments, acetone (for washing hands and brushes), filler material, wax (for surface polishing), modelling clay, releasing agent (poly vinyl alcohol), brushes and polyurethane foam.

Raw material for constructing the FRP boats is procured from shops in Chennai. As a standard norm, 3.8 kg of FRP material per sq. ft. is used. The approximate cost of construction of a 27 ft boat is estimated at Rs 65 000 (approx. US $ 1 450). The expenditure on materials and labour is as follows:

Mat-23.0%, resin-31.5%, pigment-2.5%, gelcoat-5.5%, foam-10.5%, accessories-11.5%, labour-15.5%.

The boatyard increased its production capacity to about 45 boats/ month after the 26 December 2004 tsunami. Many old hands were recalled to assist the yard in meeting orders. A number of FRP boats damaged by the tsunami also came to the yard for repair. A couple of additional moulds were prepared to meet the demand.

Mr P Gandhirajan, proprietor of Son India and a pioneer in the manufacture of FRP boats in Tamil Nadu, says that at present there are no standard designs or norms for FRP boats and no mechanism for certification of FRP boatyards. Inexperienced people set up boatyards. What they turn out is, boats poor in design and quality and unsafe as well, giving FRP boatyards a bad name. He urges a regular monitoring and quality control mechanism to maintain the standard of these boats.

He adds that boatyards like his need training and skill upgradation, particularly in layering, application of resin, gel coating and foam preparation. He also calls for strong R & D inputs into the FRP boat industry.

Mr P Gandhirajan of Son India Boatyard in Kanathur (right). FRP moulds of the boat yard, below – exterior and interior views.

range of chemicals, weathering and UV exposure;

(h) Virtually unlimited possibilities for surface finishing, including colouring to give a maintenance-free finish;

(i) Tolerance of a wide range of additives, including fire retardants.

Establishment of FRP boat-building units in Tamil Nadu

Districts	Number of FRP Units	
	Before Tsunami	After Tsunami
Chennai	-	2
Kanchipuram	2	5
Villupuram	5	15
Cuddalore	2	3
Nagapattinam	1	3
Kanyakumari	2	5
Tirunelveli	0	2
Pondicherry	1	2
Total	**13**	**37**

FRP fishing boats have the following advantages and dis-advantages:

Advantages

- Do not absorb water, hence no change in buoyancy.
- Light in weight, easy to handle, excellent surf-riding capacity, less energy required for navigation.
- Waterproof, non-corrosive, do not need drying.
- Score over wooden crafts in durability, speed, loading capacity and maintenance.
- Raw material easily available, a good substitute for wood.
- Stronger than wood, more elegant and better-looking, permit complex constructions.

Disadvantages

- Higher initial cost. Fabrication needs special skills.
- Raw material, especially the resins, needs special storage.
- Low resistance to abrasion.

The tsunami of 26 December 2004 led to a huge leap in demand for FRP boats. In Tamil Nadu, some 51 000 kattumarams, vallams and mechanised boats were destroyed or damaged, and more than 9 000 fishing craft in neighbouring Pondicherry,

Mats for FRP boats (left). The layering process with mats (left below). Chemicals used and fabrication in process (below).

But the tsunami was at once a big boost for the boat-building industry and for FRP. Overnight, existing boatyards increased their capacity and old hands were recalled. Many new yards materialised along the coast to make new boats and repair damaged boats. Backyard FRP boat manufacturers who produced two or three boats per month began to turn out more than 50.

During the Workshop on Post-Tsunami Revival of Fisheries sector and Rehabilitation of Fishing Communities held in Mahabalipuram on 6-7 February 2006, many experts commented adversely on the construction and safety measures in these newly constructed boats. It seemed that the boats were built to a price rather than to a standard. Scantling rules were grossly ignored and skin thickness appeared to be generally inadequate. The deck construction on many boats also appeared to be very weak. It was suggested that the vacant compartments in the boats should be filled with foam, otherwise serious accidents could take place. Apart from the flaws in the construction, the workers handle strong chemicals, paint and glue, and are in peril if they don't take proper precautions.

– M Paramasivam

Experiences in boat-building in tsunami-affected countries

Ari Gudmundsson, *Fishery Industry Officer (Vessels), FAO, Rome*
Daniel Davy, *FAO Consultant, Naval Architect*

The FAO has since 2005 been assisting in the reconstruction and rehabilitation of fishing communities affected by the December 2004 tsunami. This article describes experiences and lessons from boat building activities in three affected countries – Indonesia, Sri Lanka and Maldives.

Indonesia

On account of the scale of the tsunami's havoc in Indonesia and the remoteness of the worst-affected areas, accurate figures of boats lost and damaged are difficult to obtain. But it is reckoned that in Aceh/ Nias, some 7 600 boats were lost and an additional 5 000 sustained damage. Some 6 500 new boats were supposed to have been built under a rebuilding programme but the data is subject to revision. The post-tsunami boat-building programme in Indonesia has probably been the largest ever undertaken. A number of boat builders themselves perished in the tsunami, adding to the magnitude of the problem.

Fishing Vessel Regulations, Standards and Quality

There are no regulations in Indonesia (or Aceh province), applicable to the construction and safety of small fishing vessels. Most fishing vessels are lightly built wooden vessels and scantlings; they do not follow any recognised standard.

During the early part of the reconstruction effort, it became apparent that some of the boats financed through NGOs and local institutions were sub-standard in quality, or even unsafe. The quality of boat-building during reconstruction has suffered for several reasons:

- Boats built to a price rather then to a standard.
- Boat-builders handling large orders in a short time.
- In-experienced boat-builders claiming expertise they did not possess, to capitalise on high demand for boats.
- NGOs and other institutions not adequately monitoring their own boat-building programmes.

Many of the failings in boat quality have been of the most basic type such as:

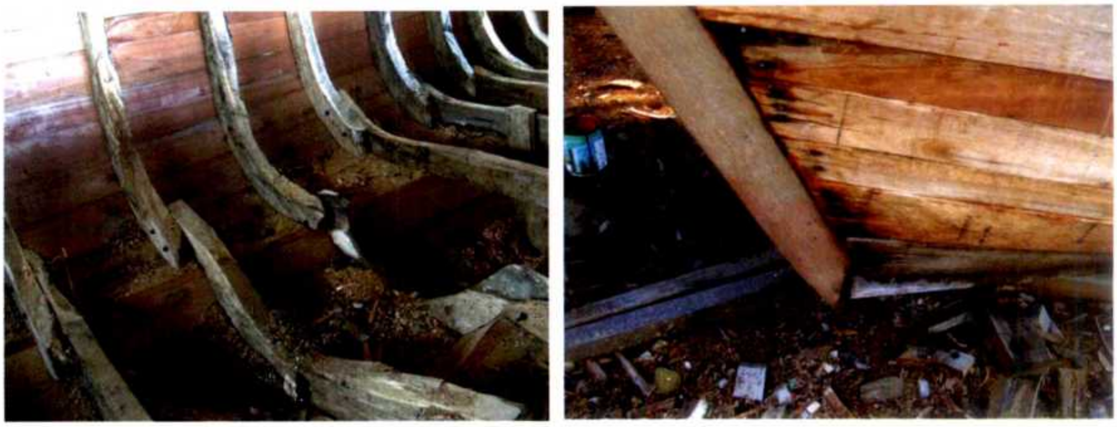
- Poorly selected timber, including sapwood and split wood.
- Thin planking, large frame spacing and small keel timbers.
- Sub-standard frame joints with unsuitable arrangement of fastenings.
- Fastenings causing numerous splits in planks.
- Inadequate through-hull fittings and pipe work.
- Use of plain steel fastenings.

Some of the effects of these basic problems are:

- New boats may have a short life. Consequently, an additional boat replacement programme might be needed in future.
- New boats require significant maintenance – in particular, to keep the hull watertight. This means time is lost at sea.
- Some completed boats are not being used by the intended beneficiaries for a number of reasons – including the perception that they are substandard or unsafe. FAO has

This article has been assembled from the experiences of FAO staff and consultants in the tsunami-affected region up to January 2006. It was presented at the Workshop on Post-Tsunami Revival of Fisheries Sector and Rehabilitation of Fishing Communities, Mahabalipuram, 6 - 7 February 2006. Since that time the situation has continued to change and develop and FAO has gained further insights and lessons from its activities in the field and has continued to provide further training and technical assistance and delivered improved fishing vessels to communities affected by the tsunami.

Examples of defective construction in post-tsunami boats from Aceh province, Indonesia.



advised that unsafe boats should not be handed over to beneficiaries and should instead be modified or broken up.

As the building of boats proceeded it became obvious that remedial activities would be needed to improve boat quality, such as:

- Training of boatbuilders and boat inspectors.
- Development of good-practice guidelines.
- Development of draft regulations for minimum construction standards.
- Work with NGOs and others to raise awareness of quality and provide technical assistance.

The FAO has developed and published "good practice" boat-building guides (for wooden boats) to enable the monitoring of programmes by NGOs and other institutions. Draft regulations on "minimum standards" of construction are now under development. In building back better, the goal is not simply to re-establish livelihoods by providing low-quality boats; a balance has to be found between responding to needs and building back better.

Boat production (especially in large numbers) is a technical exercise, which should be managed by experienced professionals. Unfortunately, some NGOs have treated boats simply as items to buy and distribute. They do not have the capability to assess the type or quality of the boats they are distributing.

Boat-building training

Following an assessment of boat-building activities in mid-2005, FAO laid a high emphasis in its activities on training and improved quality. FAO boat-building training was conducted on the eastern and western coasts of Aceh to improve skills over a large area; the trainees included 42 boat-builders and three government boat inspectors. Many of the trainees who attended the boat-building courses proved to be excellent craftsmen. Training aimed at improving the quality, safety and life expectancy of boats.

The training courses brought boat-builders from various places together and created an informal network with one another and with the FAO.

Boat Design and Changes

With its partner boatyards, FAO has introduced improved construction practices such as:

- Careful selection of timber.
- Use of galvanized fastenings.
- Improved construction techniques.
- Use of primers and bedding compound.
- New keel assembly consisting of dead wood and a shaft log.
- Simplified frame construction utilising scarf joint.
- Improved safety in design wherever possible while conforming to local style.

These will improve the life expectancy of boats at a small additional cost. In discussions regarding changes in boat design, some common themes were:

- Additional weight is considered bad by fishermen and in particular with regard to smaller boats.
- Speed is highly valued. Boats slower than competitors' boats are unpopular.
- Increased life expectancy is not necessarily a clear and immediate advantage.

The introduction of safe, appropriate and high-quality FRP boats in Aceh is considered an important development for the future. Numerous FRP boats have already been donated to Aceh both from within and outside Indonesia. This was apparently done without adequate demonstration or training in maintenance and repair. Result: some donated FRP boats have experienced problems with acceptance, quality and safety of operation. Regulations applicable to the construction of FRP vessels in Aceh do not exist.

Sri Lanka

The tsunami destroyed or damaged an estimated 24 000 craft. Early on it was decided that repairing damaged craft and engines would be the quickest and most cost-effective way of getting fishermen back fishing again. As a result, the Ministry of Fisheries and Aquatic Resources (MFAR) prepared a National Programme for Repair of Damaged Craft. Many boatyards were to participate in this programme. But the flood of orders from NGOs for new craft made many boatyards focus on new construction. It became apparent later that many craft regarded as "destroyed" were capable of repair.

The FAO did not get involved in boat-building in Sri Lanka; it facilitated boat and engine repair, and imported inboard and outboard engines.

There is no written scantling specification to monitor hull construction. In many cases the thickness of hull laminate was found to be so low that it would not have been accepted by any scantling rule. It was also noted that older boats generally had thicker laminate than newer boats. It was apparent that the quality of FRP boat-building and repairing was not being given sufficient priority in Sri Lanka.

In many cases the quality of repairs suffered because of repairs being carried out on the beach without adequate protection from sun, rain and humid air. Further, since the cost of producing an FRP hull in Sri Lanka is mainly that of material cost (labour cost is low), there is a temptation to skimp on the thickness of the laminate in order to save money.

Monitoring the repair of boats in various districts, especially the harbour-based boats, became essential. FAO recruited three national consultant marine engineers and a marine mechanic to monitor the repair of craft and engines in the various districts.

Workers skilled in FRP were very few, and unskilled labour was recruited in some boatyards; the quality of construction may have suffered as a result.

The stability characteristics of certain classes of boats caused concern. Recommendations were made for design modifications to multi-day and 19-foot boats in order to satisfy stability requirements and allow for the safe loading of ice and gear.

Maldives

The Ministry of Fisheries, Agriculture and Marine Resources (MOFAMR) has undertaken to build 89 FRP boats of 4.5 meters (m) in length to replace wooden *bokura* craft damaged or lost in the tsunami. Drawings for the 4.5 m boat were prepared by FAO.

An FAO fiberglass expert prepared a manual on FRP boat-building and repairs. This contained details of the production process at Precision Marine (one of the boatyards) on Thulusdhoo, and the boat-building school at Alifushi. Subsequently he ran practical FRP training courses, including the construction of a 15 ft boat, as well as a FRP theory training course, which included safety, quality control, sequences and repair guidelines. Some 40 trainees, including both boat-builders and surveyors from MOFAMR, participated.

When planning a replacement scheme for ***masdhoni*** boats damaged by the tsunami, the MOFAMR decided to introduce a new 85 ft (26 m) model ***masdhoni*** that the average fisherman could afford. MOFAMR plans initially to build 20 of these boats, followed later by 30 more. Bids for building the boats have been received from established boatyards.

The Masdhoni of the Maldives. Some 50 Masdhonis, 85 ft long, are being built. Even 107 ft Masdhonis are under construction.

The development of the large FRP ***masdhoni*** in the Maldives has been extremely rapid. The first 70 ft FRP ***masdhoni*** was built in 1997; today, there are ***masdhonies*** of 107 ft under construction, with talk of still bigger boats. It is evident that Maldivian boat-builders are not afraid of venturing beyond the limits of their existing experience; however, there are considerable risks, and boats at times need structural modification after launching. In terms of skilled labour, the moulding of FRP hulls and decks is often undertaken by a team of Sri Lankan workers who specialise in this type of work.

The present FRP ***masdhonis*** are not built according to any scantling rules. Hull skin thickness appears adequate, but deck construction on many boats appears very weak. The Ministry of Transport and Civil Aviation is responsible for regulations on vessel safety, and has expressed the need for assistance in formulating safety regulations for fishing vessels. The development of boats over 30 m in length without reference to any guidelines or scantling rules for this size of vessel is a cause for concern.

Recommendations

1. Regulations concerning the safety of wooden and FRP fishing vessels are urgently required in the region. These should be locally appropriate and responsive to the needs and capacities of all groups of end users – the builders, vessel owners, fishers and officials.
2. Raising awareness of safety issues (including safety at sea and construction standards) among boat owners and operators, and among NGOs local and international, is vital.
3. Training and skills-upgrading for workers in the boat-building sector, for both timber and FRP boats, is essential.
4. Data collection and updating on needs and progress is critical for the goal of building back better. A single agency should be responsible for coordination. FAO performs this role in Indonesia, Sri Lanka and the Maldives.
5. The capacity of governments and ministries in relevant disciplines needs to be strengthened.

NARA's many-pronged impact on Sri Lankan fisheries

NARA is one of the best-known acronyms in Sri Lankan fisheries. The National Aquatic Resources Research and Development Agency has for the past 25 years organised research, development and management activities on aquatic resources in Sri Lanka.

NARA was established in 1981. The main objective then was to tackle the challenges of the 200 nautical mile Exclusive Economic Zone (EEZ). Sri Lanka's EEZ represents a sea territory of 460 000 sq. km — around eight times the land territory of the country. With jurisdiction over such vast sea territory, it is imperative for Sri Lanka to organise sound management of oceanic resources and to integrate fisheries and aquatic resources into development planning.

NARA lends its expertise to resource management in Sri Lanka, to planning and management of fisheries, and to optimal exploitation of fisheries resources.
Mr K Haputantri is the chairperson of NARA, and Ms K T R Pratapsinghe the Director-General.

The main functions of NARA are to:

- Exercise all the powers and duties conferred on the Agency under the National Aquatic Resources Research and Development Agency Act No. 54 of 1981 as amended by Act No. 32 of 1996.
- Apply and utilize scientific and technological expertise for implementing the national development programme on living and non-living aquatic resources.
- Conduct research to identify, assess, manage, conserve and develop aquatic resources – in marine and inland waters, in particular.
- Organize oceanographic and hydrographic surveys and develop charts and data bases.
- Improve and develop fishing craft, fishing gear and equipment, and fishing methods.
- Undertake social and economic studies on the fishing industry, including the welfare of fishermen and their dependents.
- Advise on the development, management and conservation of aquatic resources in inland waters, coastal wetlands and off-shore areas.
- Provide advisory and consultancy services on scientific, technological and legal matters relating to the exploitation, management, conservation and development of aquatic resources.
- Co-ordinate the activities of institutions engaged in the exploitation, planning, research, development, conservation, control and management of aquatic resources.
- Undertake the collection, dissemination and publication of information and data useful for the management, conservation and development of aquatic resources and the fishing industry in Sri Lanka.
- Develop technologies and standards for product development and quality control of fish and fish products.
- Provide training relevant to the work of the agency.

Besides its headquarters at Mattakuliya, NARA has four regional research stations located at Rekawa, Kadolkele (Negombo), Kalpitiya and Trincomalee. The Agency's 50 researchers and 300 supporting staff carry out activities spread across nine divisions and two supporting divisions, which are described below.

Inland Aquatic Resources and Aquaculture Division

This Division is responsible for management and sustainable utilization of inland aquatic resources and habitats in the country. The main R & D programmes relate to environmental assessment and management for aquaculture development, verification of culture technologies for shrimps, prawns, molluscs, brackishwater fish, holothurians and artemia.

The Division conducts regular training programmes on disease management in ornamental fish farming, fish nutrition and fresh water prawn culture. Farmers have been introduced to a buy-back system where fish exporters and small-scale developers work together with NARA to promote ornamental fish farming in rural areas.

Leaflets and manuals are prepared on various farming practices such as mollusc culture, seaweed farming, shrimp culture and diseases and distributed among entrepreneurs and fish farmers. Resource surveys and conservation programs are undertaken on sensitive ecosystems such as mangroves, salt marshes and other wetlands. The Division prepares Environment Impact Assessments (EIA) and integrated management plans for coastal areas. Advisory services are provided to farmers to prevent and control diseases, water quality management, effluent treatment and sediment management.

The Marine Biological Resources Division

This Division carries out research on management, development and conservation of marine living resources and ecosystems.

- Management-oriented research projects to assess fish, crustacean and gastropod resources.
- Development-oriented research projects to assess the viability of offshore and deep-sea fisheries.
- Research projects on coastal zone management.
- Conservation of coral reef and threatened marine fauna.

Management-oriented assessments are carried from eight coastal areas between Kalpitiya and Trincomalee. The research outputs are designed to benefit mainly fishing communities and investors in offshore and deep-sea fisheries.

The conservation-oriented research aims at conserving the gene pool, creating opportunities for nature studies and ecotourism ventures. Coral reef resources are managed through resource monitoring and data collection. For marine turtle conservation, important nesting beaches are identified, and *in-situ* and *ex-situ* conservation procedures carried out.

The Division has employed a catch and effort monitoring system at six locations between Negombo and Trincomalee. Additionally, a logbook system is being used for recording fish catch data. NARA is planning a coastal resource survey with assistance from NORAD and SIDA. The Agency is also the focal point for a tsunami early warning system in the country.

Socio-Economics & Marketing Research Division

This Division carries out socio-economic studies on the fishing industry, including the welfare of fishers and their dependants, analysis of fish distribution patterns and their impact on consumers. This work is done in collaboration with other divisions of NARA. Collaborative work at present includes consultations with farmers on preparing a code of best practices for shrimp farmers and assessment of the socio-economic impact of coral reef bleaching and degradation. The Division also produces the annual Fisheries Year Book, which is the official publication on Sri Lankan fisheries statistics.

Fishing Technology Division

This Division undertakes R & D activities in fishing gear technology. Recent activities of the Division include successful demonstration of inshore Fish Aggregation Devices and improving the habitat of spiny lobsters.

Environmental Studies Division

This Division assesses the impact of agriculture on water quality of inland and coastal waters, the accumulation of heavy metals in aquatic fauna and flora, accumulation of pesticides and agro-chemicals in water as well as in fish, the effects of industrial activities on water quality, etc. The Central Environmental Authority and other regulatory agencies utilise the research outputs of this Division.

The Division also carries out EIA for development projects; chemical and microbiological analysis of drinking water, wastewater, sewage water, and industrial effluents. The Division provides advisory services to environmental management committees.

Post-Harvest Technology Division

This Division strives to minimize post-harvest losses of fish and commercialise newly developed fish products. The main activities are introduction of new food processing technologies from locally available under-utilized or non-utilized aquatic resources; and introduction of improved hygienic processing techniques for traditional fish products.

The Division offers laboratory and consultancy services on microbiological assessment, chemical analysis, food preservation, processing and quality control. It conducts research to help minimize the occurrence of human health hazards due to contamination of fish and fish products from chemical residues, antibiotics, bio-toxins and resistant pathogens. It also undertakes quality monitoring programs for fish and shrimps to ensure compliance with regulations.

Oceanography Division

This Division builds up understanding and knowledge of the marine environment, predicts changes in the ocean environment and manages coastal and marine resources. The Division has a multi-disciplinary team, which undertakes research, does consultancies and advises fishers and industrial managers. The Division conducts:

- Joint research expeditions in the Indian Ocean with international oceanographic institutions to study the monsoon circulation and other oceanographic parameters within Sri Lanka's EEZ.
- A mineral exploration programme off Beruwela to identify and evaluate deposits of heavy mineral concentrations, principally Monazite, Ilmenite, Rutile and Zircon.
- Monitor sea level changes, measure currents, temperatures, waves, tides and salinity and identify areas of ocean energy potential around the country.

The Division investigates the distribution and transportation of nutrients, trace metals, organic matter and other biological assessment in oceanic and coastal waters. It plans to set up a National Oceanographic Data Centre (NODC) for the benefit of the public and for investors in oceanography.

Information Technology Division

The Division provides an IT platform for information gathering, processing, sharing and dissemination among all stakeholders for management, conservation and development of aquatic resources. It provides Internet services, system support, Geographic information Systems (GIS), remote sensing, modeling and training in computer applications. The Division is host to local and regional level databases on aquatic resources and provides links to other institutions concerned with aquatic resources research.

National Hydrographic Office

The National Hydrographic Office (NHO), established in 1984, is accredited to the International Hydrographic Organization (IHO). It carries out hydrographic surveys through systematic data collection in inshore, near shore and offshore areas, extending up to the country's EEZ. Hydrographic surveys are also carried out for inland water bodies.

The immediate outputs of the NHO are nautical charts, thematic maps on fisheries and user-oriented hydrographic maps involving digital & analogue hydrographic data. The data is mainly used for navigation, port & harbour development, coastal zone management, delimitation of national maritime jurisdiction, control of marine pollution, coast conservation, coastal engineering projects and defence and exploration. The NHO is capable of carrying out hydrographic surveys up to a depth of 5000 m, well within the continental margin of Sri Lanka.

Library & Information Division

This Division is concerned with information retrieval, access and dissemination for research & development activities, and preparation of online information for its users.

NARA is thus Sri Lanka's lead organisation for aquatic resources and its management. One of its major constraints of late has been a 'brain drain' – some of its senior staff have left the country for better opportunities abroad. The December 2004 tsunami inflicted heavy damage on the Agency's research laboratories, equipment, computers and on its research vessel 'Sayuri'. The Agency lost valuable records collected during the past 20 years. Oceanographic and bathymetric investigations have come to a halt. The Agency is striving to recover from the effect of the tsunami and resume its pivot role in aquatic resources management and development in Sri Lanka.

NARA celebrates its 25th anniversary in 2007

NARA is convening a two-day International Conference on Tropical Aquatic Research Towards Sustainable Development (15-16 February 2007) to mark its 25th anniversary. The Icelandic International Development Agency is supporting the Conference. Current status, trends and future needs in aquatic research will be the focus of discussion in the Conference. Presentations are invited on the following session themes:

- **Post Harvest Technology & Marketing:** Quality assurance & safety, handling & processing, value addition.
- **Capture Fisheries:** Biology, stock assessment, fishing technology.
- **Aquaculture & Disease Management:** Culture practices, diseases, pathology, shrimp farming, aquatic plants.
- **Ecosystem Conservation & Management:** Coral reefs, mangroves, sea grass, sand dunes, sea turtles, whales, dolphins, seabirds, bio diversity, estuaries and inland waters, waste management & pollution.
- **Ocean Dynamics & Development:** Hydrography, climate, sealevel, ocean disaster, maritime safety, navigation, marine pollution, energy, mineral resources, data management, ocean productivity, ocean circulation, numerical modelling.
- **Socio economics and Community Issues:** Post-Tsunami rehabilitation, impact of globalization, women in fisheries, welfare, community development.
- **Technological Advancement:** GIS and remote sensing applications, potential fishing forecasting, artificial intelligence.

For more details contact the Conference Secretariat at:
conference.secretariat@nara.ac.lk

As Others See *Bay of Bengal News*

Some more reactions to 25 years of BBN

BAY OF BENGAL NEWS

"OUR BOATS ARE OUR HOMES"

"The Bay of Bengal News and I"

I have the rather unique distinction of beginning my professional career with an article for ***Bay of Bengal News*** (1990). Then, after a decade, I found myself again in the BBN, this time as the author of a cover story about a group of fishers who lived along with their families on a type of boat called the shoe-dhoni in the Godavari belt.

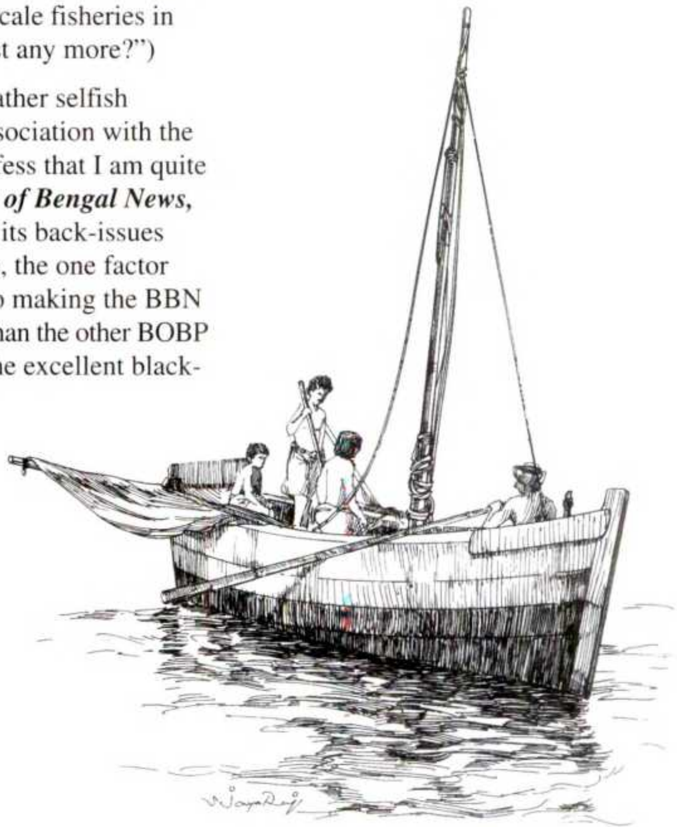
The shoe-dhoni story, when it appeared, was a hit. But I particularly enjoyed a story that my father brought home on the day when one of his senior colleagues walked into his room waving the magazine in front of his face, asking in a dismayed tone: "How could some North Indian working in the BOBP have known about these boat people? They live right under our noses and have been invisible to us for so long." It did not help that I inverted the convention and put my family name behind my proper name, but once my father explained the mystery to his senior colleague, the gentleman relaxed visibly and read the story all over again with a more appreciative frame of mind.

In fact, that particular issue of the BBN carried not one, but two of my articles; the other was about another very interesting speciality of central Andhra Pradesh coast – fish smoking. This brought me to the attention of the powers-that-be at the BOBP's newly started Post-Harvest Fisheries Project, who were impressed enough to give me a contract and fulfil my long-standing ambition to join the immortals at the Bay of Bengal Programme.

Of course, the dreams of immortality melted when confronted by the cold reality of life and the immortals themselves later moved on to other heavens. But the BBN survived and so did my association with it. I wrote many more pieces for the BBN in the intervening years. One of the last pieces I did was a kind of obituary of the Bay of Bengal Programme. (December 1999 – "Bay of Bengal Programme, a farewell and a beginning.") The BBN survived the FAO-BOBP too and has continued to soldier on, albeit in a vastly different form. My March 2000 piece was another kind of obit. ("Small-scale fisheries in India: does it exist any more?")

Apart from this rather selfish account of my association with the BBN, I must confess that I am quite an old fan of ***Bay of Bengal News,*** and keep reading its back-issues frequently. To me, the one factor that contributes to making the BBN evergreen (more than the other BOBP publications) is the excellent black-and-white and colour photographs, sketches, drawings and pen portraits that so lushly adorned almost every page. Artists like E Amalore and S Jayaraj almost single-handedly perfected a unique art form that can only be called the 'BOBP School of Art'. And as time passes, their drawings acquire new importance (tinged with pathos) as the way of life they depicted becomes tragically irrelevant.

It might not be an exaggeration to say that some of the pictures carried in the BBN were perhaps the first (and even the last) attempt at



recording a particular aspect of life in the fishing communities and preserving it for posterity.
I remember an old man in Chandipur-at-sea in Orissa who flipped through the pages of an old issue of the BBN (which I carried with me for reference). When he saw a particular photograph, he exclaimed, "But they don't do this any more!" He became quite wistful after that and told me several interesting stories about how life used to be different not so long ago.

Crowded with people and activities

An important point that strikes anyone who goes back to the old issues of the BBN (especially those from the 1980s) is how crowded it used to be: crowded with people, activities, news and, most strikingly, with an infectious sense of optimism. So many things were taking place at so many levels and in so many places that the editor must have had a tough time to reduce the information to manageable proportions.

No wonder then, that the sense of nostalgia that BBN brings to people like my father who had lived through it all is not much different from going back to an old family photo album or reading an old diary; the BBN is in many ways a family heirloom to a whole generation of people. I know an officer in the Department of Fisheries in Orissa who has got the old volumes of the BBN bound in calf-leather and preserves them so carefully that even his wife is forbidden from touching it! Tragically, it was people like this officer – the smaller cogs in a giant system for whom receiving the BBN every three months was not just a means to keep up with the latest developments, but also a symbol of the recognition of their worth – who had been left out of the mailing lists that were culled during the 1990s.

In any case, by the 1990s, the jostling for space in the magazine of people and news and activities subsided and the magazine itself took on a more sober and even brooding demeanour, notwithstanding the switchover to colour and glossy paper. Its publishing standards, always first-rate, remained the envy of the more commercial journals (as the editor of a well-reputed fisheries magazine in the country once told me, the BBN in its heyday was a formidable rival).

But there was no denying that the newsletter itself became more introspective. And as it entered into the 21st century, it became even more withdrawn, confining itself almost to a matter-of-fact record of the goings on at workshops and other events organised by BOBP and its successor organisation, the BOBP-IGO. The changing tone might be a reflection of the changing fortunes of its parent organisation, but I also tend to see it as a reflection of the changes that have taken place in the larger world, which do perhaps call for more sobriety, more circumspection and less optimism from everyone of us.

So what is the relevance of the BBN in the present time? What does it seek to address and who does it address? Obviously, these are difficult questions, but these must be confronted and addressed if the magazine were to fulfil a useful purpose. Most of the BBN has been written in-house, but it served a few other purposes as well: first, along with its more top-heavy cousins (working papers, reports, manuals) that the BOBP also fathered, it gave the small-scale fishing communities of the east coast of India (and elsewhere in the Bay of Bengal region) a recognition that they richly deserved. It also gave flesh and blood to a way of life that had gone almost unnoticed for a long time and made it possible for outsiders to relate to, and empathise with, a whole new culture that was yet so close to their own.

Now, as the same people and their cultures face new threats, the BBN must re-invent itself to address their needs in a meaningful manner, as it has done in the past, and this might necessitate broad-basing the magazine to source from, and cater to, a wider range of people and organisations.

– Venkatesh Salagrama
Director, Integrated Coastal Management, Kakinada

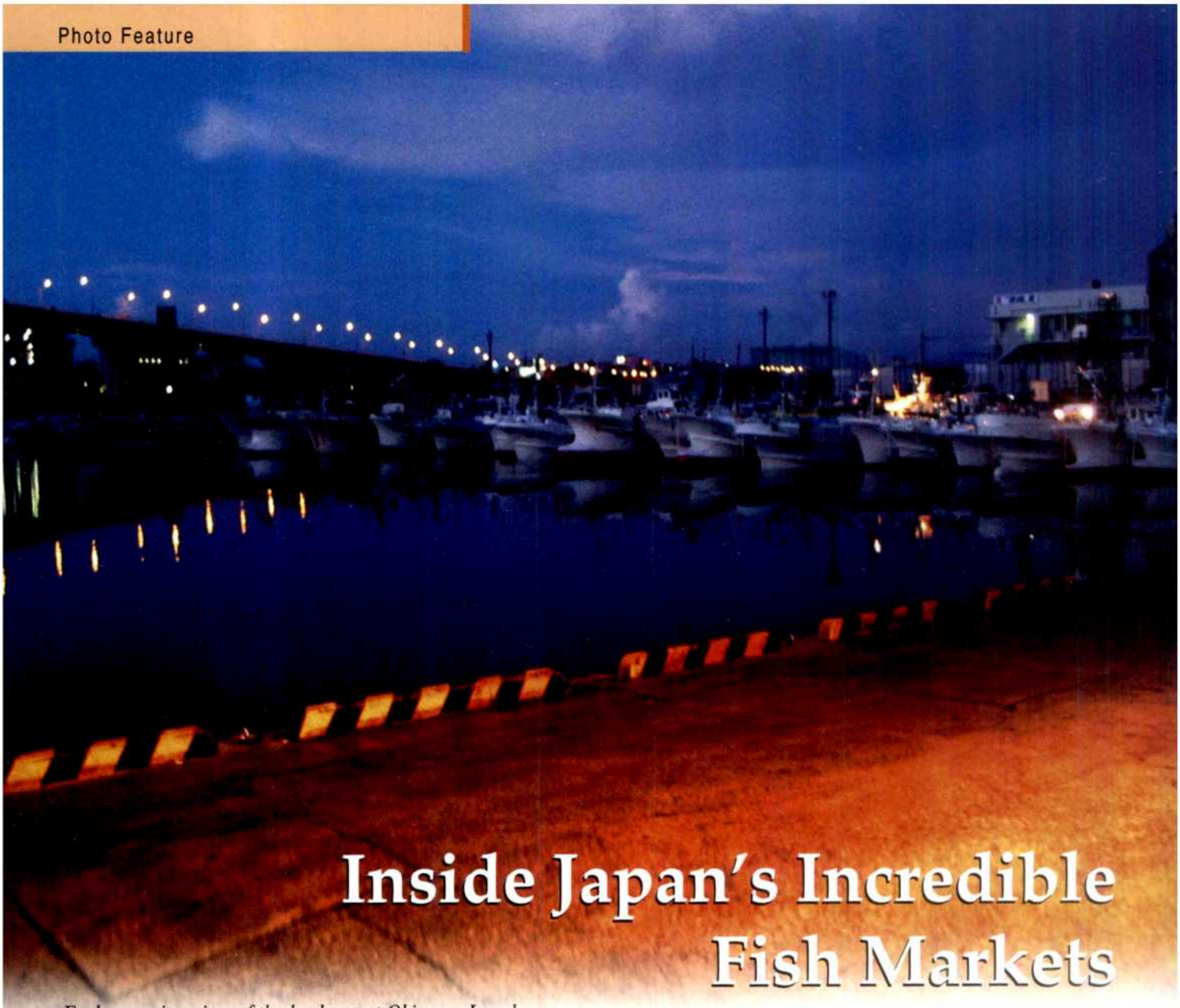
"My favourite fisheries publication"

I have been a regular reader of BBN from 1980. I know it as a useful and educative chronicler of BOBP's work concerning technology, resources, socio-economics, extension, education, biology and management in all the member-countries.

"Glimpses into BOBP projects" were short fact-filled descriptions of activities in the seven member-countries. The statistical factsheets on fisheries were nutshell summaries of the entire fisheries of a state or country in a single page. There were many technology reviews, socio-economic analyses, stories on women in fisheries, personality profiles, World Food Day articles. Every issue of BBN was in fact a wide window opening out into seven member-countries. The evocative photographs captured event and action very effectively. They also mirrored the many moods of fishermen and fisherwomen, ranging from elation to despair.

Over the years, BBN has changed from black-and-white to colour, from litho offset to art paper, but its dedication to insightful reportage and analysis and striking photo coverage remains. It is my favourite fisheries publication.

– M Paramasivam
Joint Director (Retd), Department of Fisheries, Tamil Nadu, Chennai



Inside Japan's Incredible Fish Markets

Early morning view of the harbour at Okinawa Local Wholesale Fish Market, Naha.

They are unbelievable – spanking clean, totally free of odour or clutter. A tour of fish markets and fishing harbours in Japan is almost like touring swanky shopping malls. Hygiene and sanitation are just about perfect.

This photo feature provides glimpses into the Central Wholesale Market of Tokyo at Tsukiji and the fish landing centers at Naha and Nago in Okinawa Prefecture, which I visited in September 2006.
The occasion: a field trip during the Training Project for Promotion of Community-based Fishery Resource Management by Coastal Small-scale Fishers.
The International Cooperative Fisheries Organization of the International Cooperative Alliance is implementing the project. BOBP-IGO is one of the partners.

The Tokyo Central Wholesale Market of Tokyo is the world's largest – in terms of quantity of fish as well as value. It has 114 staff for day-to-day management. Now 71 years old, the market survived bombing during the Second World War. A separate section in Tsukiji also markets vegetables and fruits.

Seven fish wholesalers (mainly companies) have been permitted by the Ministry of Agriculture, Forestry and Fisheries to conduct business from the Central Wholesale Market. Goods are sold by auction. The market's commission is 5.5 percent of the wholesale price for fishery products.

The market offers approximately 480 kinds of fishery products. Auctions for fresh fish generally start at 4.40 a.m. and proceed for different categories of fishes. The auction hours change marginally from season to season. Open from Monday to Saturday, the market closes on Sundays and national holidays, also on Wednesdays of the second and fourth week of every month.

The fishery products division has 850 intermediate wholesalers approved by the Governor of Tokyo. They run 1 650 shops, each 7 sq. metres in area. They buy from the wholesalers, display products in their shops, and sell to retailers including restaurants. The market also has some 350 authorized buyers such as retailers, processors and supermarket agents, who buy products in bulk. These buyers too have been specially approved by the Governor of Tokyo. They buy from intermediate wholesalers as well as wholesalers.

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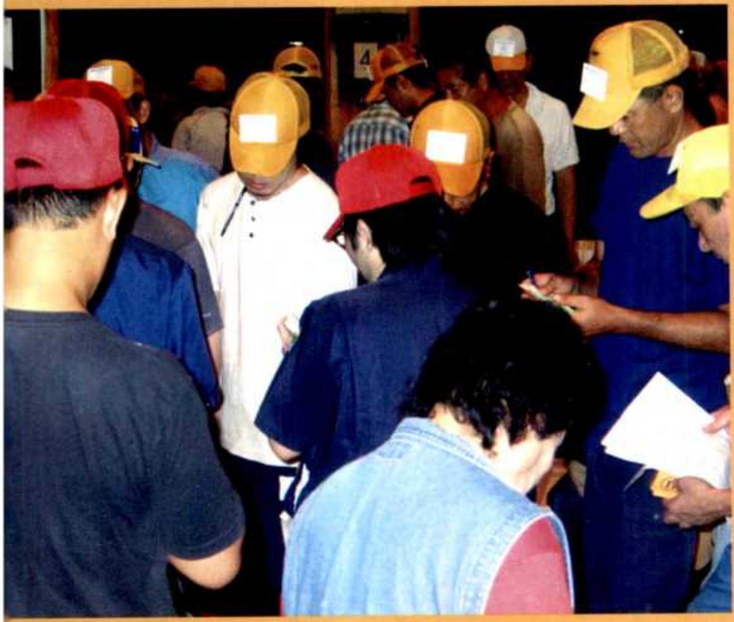

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1. *Aerial view of the Central Wholesale Market (CWM) of Tokyo at Tsukiji (Photo courtesy: Tokyo Metropolitan Government).*
2. *Packaging hall of the CWM.*
3. *Fresh tuna auction hall at the CWM.*
4. *Auction in process at the Okinawa Local Wholesale Fish Market, Naha.*
5. *The intermediate wholesale section at the CWM.*
6. *Frozen tuna being coded after auction at the CWM.*
7. *Filleting of tuna after auction at the Okinawa Local Wholesale Fish Market, Naha.*

Some vital statistics: The Central Wholesale Market of Tokyo

Parameters	Values
Total area of the market (sq. meters):	230 836
Area allocated for fish wholesalers (sq. meters):	25 003
Area allocated for intermediate fish wholesalers (sq. meters):	118 79
Area allocated for offices of companies and for storage of products:	10 000
Capacity of cold storage facilities (metric tonnes):	26 400
* Total quantity of waste generated (tonnes per day):	60
(i) Combustible waste:	*33*
(ii) Non-combustible waste:	*15*
(iii) Polystyrene waste:	*12*
* Total usage of water (cubic meters per day):	8 100
(i) Water from tap sources:	*5 000*
(ii) Filtered sea water:	*3 100*
* Total usage of electricity (Kilo-watt-hour per day):	134 000

* *Information pertains to the year 2005.*

The most commonly traded fin and shell fishes in the fresh fish category at Tsukiji are yellowtails, jack mackerels, tunas, squids, skipjack, snappers, cod and cod like species, salmon and trout, sardines and flatfishes. In the frozen category, the prominent varieties are tunas, salmon and trout, shrimps and prawns, squid, flatfishes, crabs, billfishes (marlin), snappers and sharks. In FY 2005 (April 2005 to March 2006), 2 140 metric tonnes/ day of fishery products valued at 1 750 million Yen/ day changed hands.

I also visited two fishing harbours and their auction centres in Okinawa Prefecture. This is Japan's southernmost Prefecture, and consists of hundreds of islands in a chain over 1 000 km long. Okinawa's climate is tropical and the Prefecture is famous for its tuna fishery. The first market was located at Tomari Fishing Port in Naha city, also the capital of Okinawa Prefecture.

The Okinawa Local Wholesale Fish Market deals only with fresh fish. It has separate areas for auction of tuna and tuna-like species and for species other than tuna. The Wholesale Fish Market takes a commission of 5 percent from the auction. A retail fish market attached to the wholesale market caters to the needs of local consumers.

The fishing harbour of the Nago Fisheries Cooperative Association (Nago FCA) has an auction hall where catch landed by FCA members is auctioned. This market too deals only in fresh fish. The FCA also charges a commission of 5 percent to maintain the auction hall and provides members with other support facilities.

The hygiene and sanitation standards at both the harbours and the quality of fish landed is very high. Each fish or a batch of similar species is coded to give details of the source of capture, size, etc. Sellers and buyers in the auction are differentiated by the colour of the caps they wear. The FCA staff records all transactions; this information is useful for fisheries management. The FCA staff also ensure that no banned or undersized species are traded by fishers. Stiff penalities are imposed for violating Prefecture Laws.

– Y S Yadava

Some important varieties of fin and shell fish species displayed for auction at the fish markets.

Asia-Pacific Fishery Commission Explores Changing Role

The 29th session of the Asia-Pacific Fishery Commission (APFIC), held from 21 to 23 August 2006, in Kuala Lumpur, Malaysia, reflected its new role as a consultative forum on major issues, and as an adviser to governments and other members of APFIC. Forty-three participants from 14 member countries, plus observers from nine inter-governmental, international and regional organizations took part.

The Commission reviewed the activities of APFIC since its previous session; considered a paper on the status and potential of fisheries and aquaculture in Asia-Pacific; discussed the report of APFICs Regional Consultative Forum meeting (see pages 29 - 32). It adopted a workplan on major issues APFIC should take up at its next session, and heard comments from APFIC donors and partners.

Dr Y Bhg Dato' Junaidi bin Che Ayub, Director-General, Department of Fisheries, Malaysia, welcomed participants. Dr Ndiaga Gueye, Chief, International Institutions and Liaison Service, FAO welcomed the participants on behalf of Mr Ichiro Nomura, FA0 Assistant Director-General. An opening address was delivered (on behalf of Tan Sri Dato' Sri' Abi Musa Asa'ari bin Mohamed Nor, Secretary-General, Ministry of Agriculture and Agro-Based Industry, Malaysia) by Tuan Haji Mokhtar bin Ismail, Under-Secretary. The speakers urged participants at the session to look at regional recommendations that could form the basis of collaborative work by the Commission's members.

APFIC: Activities since previous session

The AFIC secretariat summarized the main activities undertaken since the 28th session. One of these activities is the recently launched website http://www.apfic.org, which has proved to be an excellent medium for information dissemination, especially after the December 2004 tsunami. It also facilitates links with other regional fishery bodies and meets the needs of fishers' professionals in the APFIC region.

The APFIC secretariat has organized four successful regional consultative workshops, with a range of regional institutions. Two of these (in March 2005 and 2006) related to post-tsunami rehabilitation of fisheries and aquaculture; one to low-value and trash fish; and another to mainstreaming fisheries co-management. APFIC also organized the regional consultative forum referred to earlier, and several background reviews that provided preparatory inputs for the forum.

The APFIC secretariat has actively pursued collaboration with regional and international organizations such as the BOBP-IGO, INFOFISH, International Collective in Support

Delegates to the 29th session of APFIC in Kuala Lumpur.

of Fishworkers (ICSF), the Mekong River Commission, NACA, SEAFDEC, etc. A consortium formed with five of these bodies pooled intelligence on the tsunami's impact and facilitated coordination of tsunami responses.

Overview of fisheries and aquaculture

The session discussed an APFIC overview of the "Status and potential of fisheries and aquaculture in Asia and the Pacific". The overview highlighted the fundamental importance of fisheries and aquaculture for the national economies of APFIC member-countries and for their contribution to nutrition, jobs and livelihoods. The region is a dominant world player in fisheries and aquaculture. (In 2004, the region accounted for 49 % of the global production of captured fish and 91% of global aquaculture.)

The main challenges to fisheries and aquaculture relate to (i) marine coastal fisheries (integrated coastal management, increasing benefits through better management); (ii) pelagic offshore fisheries (access to resources); (iii) demersal offshore fisheries (sustainable expansion); (iv) inland fisheries (competing water uses and environmental impacts from external factors); (v) aquaculture (site and feed constraints, increasing trade-related issues).

Some main messages from the overview were that APFIC member-countries would continue to be major suppliers of fishery products. The share of aquaculture is increasing, but there are several significant constraints. The changing trends in regional and international trade, production methods and consumption will impact the prices of fish and its availability. Major issues for the sustainable development of the sector include illegal, unreported and unregulated fishing (IUU) and international trade. During discussion on the subject, several members expressed the need to improve information-sharing on fisheries and aquaculture to enable better resource assessment and management. Such arrangements should be possible at the sub-regional level.

Many members pointed out that the costs of food safety development, plus the costs of eco-labelling and certification would lead to the further marginalization of small-scale fishers and farmers, and aggravate poverty. The Commission suggested that it could possibly look into the pre-harvest aspects of aquaculture and fisheries, as this was an area that directly affected small-scale producers. The Commission also called for greater collaboration among APFIC member-countries in improving training and capacity-building in food safety and trade.

Low-value and trash fish

The session discussed APFIC's findings and recommendations on low-value/ trash fish emerging from two regional consultative workshops on the subject.

On the basis of reviews of low value/ trash fish conducted by APFIC in Bangladesh, India, Indonesia, the People's Republic of China, the Philippines and Thailand plus a similar study in Vietnam (carried out by the Australian Centre for Agriculture Research), the APFIC secretariat said the percentage of low value/ trash fish recorded in these countries ranged from 4 percent to 38 percent of the total marine capture landings, with a weighted average percentage across the region of 25 percent. Applying this ratio to the landed catch in 2003 gave a figure of 9.8 million tonnes being used for livestock/ fish, and 29.5 million tonnes used for human consumption. (The Commission noted Vietnam's doubts about the veracity of these figures, and said they would be further reviewed.)

The Commission said that the term "trash fish" is misleading; its use should be discouraged. It agreed with the following definition: *"Low value fish" refers to fish that are generally of relatively low economic value and typically small sized. They can be used for either human consumption or as animal feeds (both fish and livestock). They may be used directly in both aquaculture to feed other fish or processed into fish meal/ oil for incorporation into formulated diets. The same is true for human food, where the fish may be consumed directly, or further processed often using traditional methods of processing small fish.*

The Commission strongly recommended action on three fronts

Some of the member-country delegates to APFIC.

on issues relating to low value fish production in the APFIC region: Improved management of fisheries; improved utilization of low value fish for human consumption; and improved feed for aquaculture.

Suggested action to improve management of fisheries included:

- Reduce trawling and push net effort and fishing capacity (and clearly monitor the effects of capacity reduction).
- Improve the selectivity of fishing practices/ fishing gear, in particular gear to increase the size of fish captured.
- Introduce mechanisms for rights-based fisheries and co-management (to facilitate a reduction in the 'race for fish').
- Establish mechanisms to identify and protect juvenile nursery areas (refugia/ closed areas, seasonal closure).
- Provide alternative income-generating activities.
- Link fisheries and aquaculture policies to policies in other sectors (particularly agriculture) and to more general development policies.

Suggested action to improve utilization of low-value fish for human consumption:

- Improve post-harvest fish handling for human consumption and enhance food safety measures.
- Develop new fish products through processing.
- Promote the benefits of fish for improving food security and reducing poverty in the region.

Suggested action to improve feeds for aquaculture:

- Fast-track the change-over from direct feeding to pellet feeding (shrimp aquaculture is already based on pellet feed);
- Reduce the fish meal content of aquaculture feeds;
- Invest in feed research for inland/ marine species; and
- Encourage integrated fish farming for the culture of herbivorous and omnivorous species.

Selected issues of regional importance: co-management, governance and institutions

The Commission discussed a document on "Mainstreaming co-management" based on APFIC workshops and background papers. There have been several successes with co-management – which is based on decentralization, and a partnership between government and local communities using this approach. But these have been supported by donors in pilot projects rather than by governments. The challenge is to find a way to make co-management a mainstream practice of both government and non-government organizations and communities.

The Commission agreed with the following definition for fisheries and aquaculture co-management: ***Fisheries/ aquaculture co-management is a partnership approach where government and the fishery/ aquaculture resource users share the responsibility and authority for the management of a fishery or fisheries/ aquaculture resources in an area, based on collaboration between themselves and with other stakeholders".*** It recommended that to mainstream co-management the member-countries should:

- ensure that co-management addresses key national policy objectives such as reducing overexploitation of fish stocks, and reducing poverty;
- review, develop and amend national fishery policy and legislation, where necessary, to support fisheries and aquaculture co-management;
- invest adequate resources in developing co-management;

What is APFIC?

The Asia- Pacific Fishery Commission (APFIC) was established in 1948 as Indo-Pacific Fisheries Council. The name changed to Indo-Pacific Fishery Commission in 1976, and its present name in 1994. Set up under the aegis of FAO (Article XIV of FAO Constitution), the Commission works from the FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. The Commission covers the Indo-Pacific area (including inland waters). The Commission is mandated to "promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations and by the development of related processing and marketing activities in conformity with the objectives of its members".

APFIC discussed and recommended a number of actions on low-value fish production.

- ensure appropriate budgets for fisheries co-management practices at all levels;
- define and communicate the respective roles and responsibilities of all stakeholders;
- assist in the empowerment of communities, and ensure equitable distribution of the benefits of co-management; and
- facilitate human and institutional capacity-building at all levels across communities and scales, in particular ensure that government staff at all levels are adequately skilled and experienced to facilitate the implementation of fisheries co-management.

APFIC discussed co-management (partnership between government and local communities) in both aquaculture and fisheries.

Policy Challenges

The APFIC secretariat had commissioned a policy analysis to examine the main policy directions being taken in fisheries and aquaculture, and the main drivers of policy change. The study examined national policies relating to extension of fishing effort to offshore areas, creation of alternative livelihoods to assist fishers to leave fisheries, growth targets for aquaculture and capture fisheries, co-management initiatives and prioritising poverty alleviation targets. Although the details of fisheries and aquaculture policy differed between countries, the study found a surprising degree of similarity between the main policy directions and strategies. Almost all policies in the region stated food security, poverty alleviation, community/ co-management and decentralization, fishing capacity reduction, improvements in administrative efficiency, and cross-sectoral collaboration as policy objectives.

Discussing the Forum's findings, the Commission highlighted some more points: (i) the need to enhance the economic and social status of fisherwomen whose roles are critical in poverty alleviation; (ii) fisheries management and aquaculture growth; (iii) the allocation of money to reduce fishing capacity and to address IUU fishing; (iv) the management and resolution of conflicts between large-scale and small-scale fisheries; (v) better and more secure livelihoods of small-scale fishing communities through *inter alia* better safety at sea, conditions of labour and health; (vi) the encouragement of policy harmonization across the region while respecting policy differences resulting from differences in economic and social development; (vii) regional and bilateral cooperation and agreements to better regulate fisheries and strengthen MCS; (viii) the need for better information and research to inform policy-making; and (ix) the potential of biotechnology in better fish utilization.

The Commission concluded that, in general, the region is well served by policy and strategies. But future work should focus some more on policy implementation – policy development by itself is not enough. Better participation by stakeholders in formulating policy will improve implementation.

Emerging issues

The APFIC Secretariat informed the Commission about two emerging issues revealed by the 2006 edition of APFIC's *Status and potential of fisheries and aquaculture in Asia and the Pacific*. These were illegal, unreported and unregulated fishing and aquaculture and fishery products standards and trade. (see article on pages 29-32, for more information).

The Commission reaffirmed that the overarching focus of APFIC should be small-scale fisheries and rural aquaculture that lead to poverty reduction, especially for women and socially deprived communities. It recommended the following two priority areas to be included in the next workplan of APFIC:

(i) Managing fishing capacity: This should include reducing and combating IUU fishing; improving co-management in both the small-scale and large-scale sub-sectors; a special focus on low value fish; developing management plans at all levels, including region-based plans; resource assessments; and promoting regional and sub-regional cooperation.

(ii) Fish trade and standards: This should include both aquaculture and capture fishery products; issues of eco-labelling and traceability; better pre-harvest management; bilateral cooperation; and improved sharing of information and human capacity building.

APFIC's workplan for 2006-2008 was also discussed. The Commission agreed to host the next session in Indonesia in August 2008.

Reforming fisheries and aquaculture: APFIC Forum provides food for thought

Many significant ideas and suggestions on "Reforming fisheries and aquaculture" emerged from the regional consultative forum of APFIC (Asia-Pacific Fishery Commission), which met in Kuala Lumpur from 16 to 19 August 2006.

The Forum preceded the 29th session of APFIC, held from 21 to 23 August 2006 at the same venue. (an article on the main APFIC meeting appears on pages 25 - 28). It was attended by 88 participants from 16 APFIC member-countries and 15 international, inter-governmental, and non-governmental organizations active in the fishery sector.

The goal of the APFIC Forum meeting (referred to as RCFM) was to analyse and agree on actions needed to reshape fisheries and aquaculture in the Asia-Pacific region. Specificially, RCFM was to provide background material on the status and trends of fisheries and aquaculture in the Asia-Pacific; develop action plans to address two major issues (trash fish fisheries and fisheries co-management); and discuss two other issues – fish trade and standards; and illegal, unregulated and unreported (IUU) fishing. The RCFM also addressed broader policy challenges facing all members, such as incorporation of fisheries and aquaculture concerns into national poverty reduction strategies; and integration of fisheries management into large marine ecosystem management.

The Director-General, Department of Fisheries, Malaysia, Y Bhg Dato' Junaidi bin Che Ayub, welcomed participants. He said the forum would strengthen the role of APFIC through better knowledge of fisheries issues, sounder policy formulation and assistance to member-countries in reshaping their fisheries.

In a thoughtful keynote address, Mr Ichiro Nomura, Assistant Director-General, FAO Fisheries Department, described the evolution of APFIC as a regional consultative forum. He said the forum would act as a neutral platform to assist its members in discussing emerging issues in fisheries and aquaculture.

Participants at the APFIC Forum.

Sida
APFIC REGIONAL CONSULTATIVE FORUM
Reforming Fisheries and Aquaculture in Asia-Pacific
16 - 19 August 2006 Kuala Lumpur, Malaysia

Mr Nomura said that successive waves of "boom and bust" had characterised the development of fisheries and aquaculture in Asia and the Pacific. In fisheries, stocks and habitats were being exploited one after another by newer and more effective fishing techniques to meet widening demand and expanding markets for fish. This phenomenon had led to the decline of pearling in the 1800s, trawling in the 1960s, and purse seining for small pelagics in the 1970s. About a decade ago, a point was reached where under-exploited stocks were very few, so were areas for fleets to develop.

As regards aquaculture, Mr Nomura said that remarkable growth had occurred in some parts of the region; but there were also rapid shifts in technology and in species farmed. There are today many constraints to further development of aquaculture – including the supply of aquaculture feed and the areas of expansion.

He said that in view of the unprecedented changes in fisheries and aquaculture in the Asia-Pacific region in recent times, reforming fisheries and aquaculture was urgent – to ensure sustainability and to strengthen livelihoods and economies in the region.

The RCFM was officially opened by Dato' Seri Hj. Mohammed Shariff Hj. Omar, Deputy Minister of Agriculture and Agro-based Industry, Malaysia. He said that regional fisheries bodies should assist members in addressing the issues that now confronted fisheries and aquaculture. In this context, Malaysia welcomed the new role of APFIC as a consultative forum.

Dr Derek Staples, secretary of APFIC, explained the arrangements for RCFM, its objectives and expected outcomes. RCFM was designed as a platform for discussion, he emphasised. Forum participants debated four main themes, which are among the hottest issues in global fora today.

- The future of fisheries and aquaculture in Asia and the Pacific region and the low value/ trash fish problem.
- Co-management, governance and institutions.
- Policy challenges.
- Emerging issues.

The Forum's final session heard a summary and a presentation of the recommendations to be forwarded to APFIC. Posters prepared by members concerning national experiences with policy development, co-management and other issues, enriched the information exchange.

Theme 1: The future of fisheries and aquaculture in Asia and the Pacific, and the low-value/ trash-fish problem

Discussing the status and potential of fisheries and aquaculture in the region, Dr Staples said that the world produced about 95 million tonnes from capture fisheries; the Asia-Pacific region contributed nearly half of this amount. In aquaculture, the region's contribution is about 90 percent (40.4 million tonnes out of 45.5 million tonnes). Production in the region has grown by 3 percent since 2002 for capture fisheries, and by 12.5 percent for aquaculture (excluding aquatic plants). China and Thailand are among the world's top five exporters of fish. As regards employment, Asia accounts for 87 percent of the world's fishers and fish farmers, with 33 million people engaged in fishing and 9.5 million in fish farming. Many of these activities are pursued on a part-time basis as part of a complex livelihood.

In capture fisheries, production of pelagic species peaked in the late 1980s and then declined and levelled off. Demersals peaked in the mid-1970s, declined and then levelled off and never returned to the mid-1970s level. Unlike capture fisheries, aquaculture production is continuing to grow. There has been a steady increase in the APFIC region's production with a dramatic increase reported for China (about 70 % of the total production from the region). Eight APFIC member-countries (including USA) are among the top 10 producing countries.

Scientific surveys have been conducted in many areas of Asia, including India, Indonesia, the Philippines, Thailand and Viet Nam. All of them show dramatic declines in stocks, with current biomasses between 6 percent and 30 percent of the biomass recorded 20 to 30 years ago. There are 65 large marine ecosystems (LMEs) worldwide, of which 20 are in the APFIC region.

Dr Staples summarized the challenges to fisheries and aquaculture in five sub-sectors:

- marine coastal fisheries — integrated coastal management, increasing catches through better management;

- pelagic offshore fisheries – access to resources;
- demersal offshore fisheries – sustainable expansion;
- inland fisheries – competing water use and environmental impacts from external factors; and
- aquaculture – site and feed constraints and increasing trade related issues.

Addressing these issues requires action both regionally and by countries. The Forum agreed that all countries should:

- apply a number of fishery management interventions (reducing the capacity of trawlers and pushnetters; improving gear selectivity; introducing more effective rights-based management; protecting nursery areas; and seeking alternative employment options for fishers);
- improve post-harvest interventions that could be used to improve the utilization of low value/ trash fish (improve onboard handling, diversify product forms); and
- address the demand for low value/ trash fish by aquaculture by improving feeds for aquaculture

Theme 2: Co-management, Governance and Institutions

The Forum debated co-management, one of the buzzwords in fisheries today (management can't succeed without active co-operation on the part of all stakeholders). Presentations were made by Mr Robert Pomeroy of the University of Connecticut, USA (on lessons learned in Asia, Africa and the Caribbean on mainstreaming fisheries co-management); by Mr Pedro Bueno of NACA (on co-management in aquaculture); by Mr Simon Funge-Smith of FAO-RAPA (on strategies and action to mainstream fisheries co-management in the APFIC region); and by Mr Suriyan Vichitlekarn of SEAFDEC (on fishery rights). It also heard country experiences in co-management from Australia, Bangladesh, Cambodia, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Philippines, Pakistan, Sri Lanka, Thailand and Vietnam.

The Forum defined fisheries co-management as "a partnership approach where government and the fishery resource users share the responsibility and authority for the management of a fishery or fisheries in an area, based on collaboration between themselves and other stakeholders." The Forum recommended that fisheries co-management be mainstreamed into national systems of management in the countries of the Asia-Pacific region, building on previous activities. It suggested that APFIC members should invest enough money to develop co-management and allocate budgets for fisheries co-management practices at all levels. Co-management should address key national policy objectives such as reducing overexploitation of fish stocks, overcapacity and poverty reduction.

The Forum urged members to assist in the empowerment of communities, facilitate capacity-building at all levels across communities and scales, and particularly ensure that government staff at all levels are adequately skilled and experienced to facilitate the implementation of fisheries co-management. The Forum urged all parties to share information and experiences on co-management and asked research agencies to undertake applied research on co-management, and particularly utilize traditional knowledge, management practices and experiences.

Theme 3: Policy challenges

The Forum undertook a policy review of member-countries to provide a regional synthesis of topical policy issues and to consider key policy drivers. Describing some of the findings of the review, Mr Graeme Macfadyen of the Poseidon Aquatic Resources Management Ltd said that many national policies referred to poverty alleviation and increases in exports as key objectives but did not address distribution aspects or the impact of trade.

Posters presented by Bangladesh, Sri Lanka and India at the Forum.

Title: Policy directions for Bangladesh
Policy directions on fisheries & aquaculture for Sri Lanka
Implementation of the Code of Conduct for Responsible Fisheries in India

Mr Andy Thorpe of the University of Portsmouth presented a paper highlighting the fact that though Asia is the foremost producer in capture fishery and aquaculture, the two subjects were hardly mentioned in poverty reduction strategies. He suggested that "flagship" projects should be established in fisheries and aquaculture to highlight their importance at the regional level. Links should be established with the UNDP to develop fish trade strategies.

The Forum referred to "policy gaps" and suggested "harmonization" on some matters between the national policies of countries, particularly neighbouring countries. There was no reference in many national policies to international and bilateral arrangements. Likewise, there were few references to gender-related issues. There was little investment in fisheries management. On poverty reduction practices, the Forum suggested that countries of the region should do more to link with and influence the policies and activities of international agencies, such as UNDP and UNESCAP, which had a sub-committee on Poverty Reduction Practices.

The Forum expressed concern that the Asian Development Bank has "de-prioritized" support to fisheries. It suggested measures to improve understanding among fishing communities, managers, and policy-makers of the linkages between fisheries and the ecosystem. This could lead to integrated fisheries and habitat/ ecosystem management. It was also necessary to build the capacity of the authorities concerned to ensure that fisheries issues were integrated into the overall marine management framework.

Theme 4: Food quality & safety in the context of trade

Mr S Subasinghe of INFOFISH described major trends in the global seafood trade and how these related to the Asia-Pacific region. He said that cultured shrimp was rising in importance globally, while shrimp seems to have replaced canned tuna as a consumer favourite in the US. In the European Union, there has been a sustained increase in consumption and demand for all products, both fresh and frozen, from the Asia-Pacific. He said that increased purchasing power is also driving the import of more expensive products. Developed countries seem to have lowered tariff barriers but increased non-tariff barriers. Supermarket purchasing power is a strong influence on global trade and is emerging in both developed and developing countries. The power of supermarkets strongly affects markets and trade, so does environmental lobbying.

The Forum noted that with increased trade in fish products, food quality and safety issues had become increasingly important for countries in the APFIC region. There is some concern that small-scale fishers and unorganized farmers are at a disadvantage in trade if very strict measures are put in place on food standards issues. Public support for small-scale farmers and fishers should be sustained to enable them to confront the impact of the new standards. A harmonized approach to HACCP standards for aquaculture must be worked out across countries in the Asian region.

About illegal, unreported and unregulated fishing – another "emerging issue" – the Forum said that many countries do not have the capacity to adequately address IUU fishing. There is no mechanism in place for regional co-ordination of management measures, including management of foreign vessels' access to EEZs and international waters. Monitoring, control and surveillance are poorly developed across the region and compliance is low.

Excess capacity is one of the main drivers of IUU fishing. Countries should urgently begin to manage the issue of overcapacity of their national fishing fleets, review national legislation on IUU fishing and support international initiatives on the management of shared stocks and IUU fishing. A more coordinated regional and sub-regional approach must be adopted to IUU fishing. The Forum recommended that countries should sign on to and implement international instruments such as the UN Straddling Stocks Convention and the FAO Compliance Agreement.

As the end of three days of substantive discussion and debate, participants agreed with Mr Ichiro Nomura: "The need to reform fisheries and aquaculture is urgent – there is simply no other choice."

Marine Fisheries Census for India, 2005

The publication "Marine Fisheries Census 2005," out recently in two volumes, is the outcome of a massive census effort relating to marine fishers and fisheries in India. Compiled by the Central Marine Fisheries Research Institute (CMFRI), Cochin, and the Fishery Survey of India (FSI), Mumbai, it provides a wealth of data invaluable for planning, research and decision-making, and for formulation of long-term strategies to meet current and future challenges.

Reliable data and databases are a pre-requisite for sound development plans. Marine fisheries planning and governance depend on reliable databases concerning human, material and financial resources – fishers, catches, craft and gear, fishing effort, prices and markets.

Capture or management interventions also require detailed information on landings, trends, species ratio and compositions, size at capture, length frequencies, catch per unit effort, mortality rates, and many other parameters.

Census history

The publication "Marine fisheries census 2005," is a treasure-house of factual data. The CMFRI did the census for all maritime states and mainland Union Territories (UTs); the Fishery Survey of India executed the work for the UTs of Andaman and Nicobar and the Lakshadweep Islands. The Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture funded the census.

A preamble to the publication recalls the CMFRI's first census on marine fisheries carried out way back in 1948-49. It was a survey of marine fishing villages and landings. Progressively better and more detailed surveys were carried out in 1957-58, 1961-62 and 1973-77.

In 1980, a well-organised and systematic census was carried out in all the maritime states of the mainland (except Maharashtra where the state government organised a census the previous year). It yielded valuable micro-level data on all maritime states. The results were published by CMFRI in its ***Marine Fisheries Information Service*** No. 30, published in 1981.

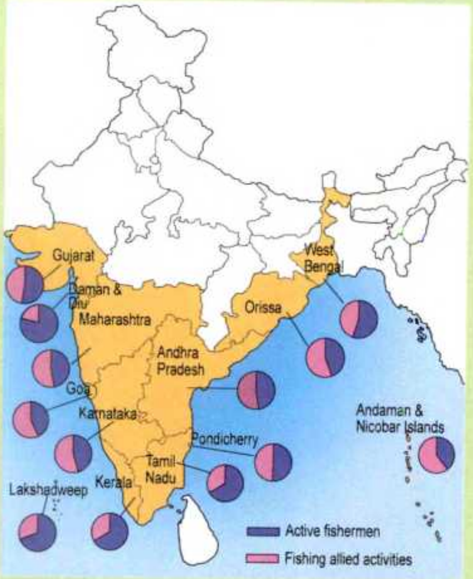
The 2005 census was carried out after a gap of two-and-a-half decades, a period of substantial change in the marine sector – characterized for example by the introduction of mechanized trawlers and purse-seiners, the motorization of country craft, the advent of multi-day fishing crafts and new livelihood challenges facing fishers. The most extensive and intensive census so far, it was preceded by planning, technical consultations and census design exercises, by data collection schedules and awareness-raising publicity materials such as posters and handouts, and by sample surveys to test the schedules and train data enumerators.

Marine Fisheries Census 2005
NATIONAL MARINE FISHERIES CENSUS 2005
UNION TERRITORIES OF
ANDAMAN & NICOBAR AND
LAKSHADWEEP ISLANDS

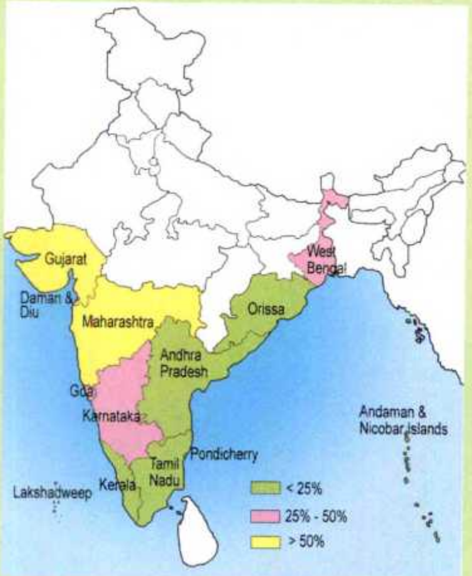
The census was carried out from April 15 to May 15, 2005 in all marine states except Tamil Nadu and Pondicherry, where it was put off to November-December, because of tsunami relief operations and the resettlement of fishers. A network of CMFRI officials conducted and coordinated the entire exercise, which covered 3 202 fishing villages, 1 332 landing centres and 756 212 households along maritime states.

The census data were collected at two levels. The enumerators

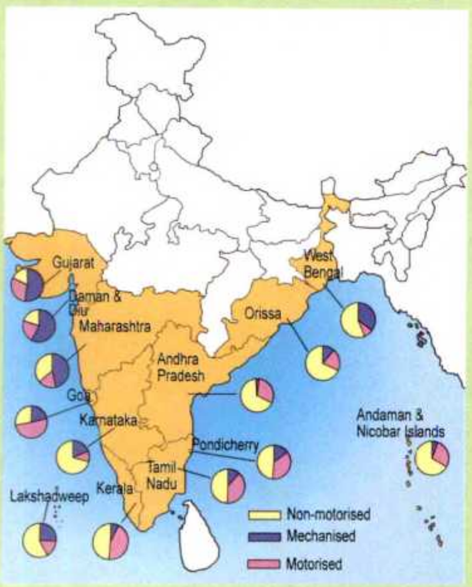
State-wise profile of fishers engaged in fishing, and fishing allied activities


Gujarat
Daman & Diu
Maharashtra
Goa
Karnataka
Lakshadweep
Kerala
Tamil Nadu
Pondicherry
Andhra Pradesh
Orissa
West Bengal
Andaman & Nicobar Islands
Active fishermen
Fishing allied activities

Degree of mechanisation


Gujarat
Daman & Diu
Maharashtra
Goa
Karnataka
Lakshadweep
Kerala
Tamil Nadu
Pondicherry
Andhra Pradesh
Orissa
West Bengal
Andaman & Nicobar Islands
< 25%
25% - 50%
> 50%

State-wise profile of fishing craft ownership


Gujarat
Daman & Diu
Maharashtra
Goa
Karnataka
Lakshadweep
Kerala
Tamil Nadu
Pondicherry
Andhra Pradesh
Orissa
West Bengal
Andaman & Nicobar Islands
Non-motorised
Mechanised
Motorised

Maps – not to scale

obtained micro-level data on individual households. Macro-level village-wise data, mainly on infrastructure facilities, was compiled by supervisors (CMFRI staff).

Some glimpses into summaries of data follow, along with graphs and tables prepared from selected data. In some cases, the results of the 1980 and the 2005 censuses are also compared (see table 1).

Glimpses into the summary data (census in coastal States and UTs)

Fisher population: Some 3.52 million fishers and family members who belong to 756 212 households live in 3 202 marine fishing villages of India. Orissa has the largest number of fishing villages – 641; Daman & Diu has the least (22). Women form 48.6 percent of the population; there are thus 948 females per 1 000 males. The average family size is 4.7. It is the highest in Karnataka (5.7), the lowest in Pondicherry (3.7).

Education: Nearly 56.5 percent of the fisherfolk are educated, the levels of education varying from primary (28.6% of the fisherfolk) to above-secondary education (5.6%). Kerala records the highest percentage of educated fisherfolk (72.8%), Andhra Pradesh (67.5%) has the highest percentage of un-educated fisherfolk.

Occupations of fishers: About 25.7 percent (889 528) of the fisherfolk are active fishers, of whom 80.7 percent (717 999) are full-time fishers. Table 2 details the occupations of fishers in India. About 46.8 percent of the fisherfolk engage in fishing and fishing-related activities. Among men, the major fishery-related occupations are labour (39.2%), net-mending (28.6%) and marketing (14%). The major women's occupations are marketing (41.8%), labour (18.4%) and curing/ processing (18%). Women dominate in fish marketing (73.6%), while men dominate in net-repair and net-making (nearly 80%) and in providing labour to fishing boats (69.5%)

Religion: Hindus constitute 74.1 percent of fisherfolk families, Christians 16.6 percent and Muslims 9.2 percent. Christians dominate in Kerala (42.4%), followed by Hindus (30.7%) and Muslims (26.9%). Christians are significant also in Goa (37.3%) and Tamil Nadu (34.6%).

Fisheries co-operatives: About 15 percent of the fisherfolk are members of fisheries co-operative societies, one in five fisherfolk is a member of some co-operative society (either fisheries or any other). Tamil Nadu, Pondicherry, Kerala and Karnataka record significant percentages in co-operative membership.

Craft: Of the 238 722 fishing craft in India, 58 911 are mechanized and 75 591 motorized. Maharashtra and Gujarat account for 44.5 percent of the mechanized craft (Maharashtra has 13 053, Gujarat has 13 047). Of the 29 241 trawlers in the fishery, Gujarat accounts for 8 002, Tamil Nadu for 5 300, Maharashtra for 4 219, Kerala for 3 982. Tamil Nadu, Andhra Pradesh and Kerala together account for nearly two-thirds of the motorized craft. East coast states account for about 73 percent of the non-motorised/ non-mechanized craft.

Craft owned by fisherfolk: Of the 185 438 craft owned by fisherfolk, 35 806 are mechanised, 52 971 motorized and 96 661 non-motorized/ non-mechanized.

Table 1: A comparison of census figures from 1980 & 2005 – landing centres, fishing villages & fisher population

State/ Union Territory	Landing centres (nos) NMFS 1980	Landing centres (nos) NMFS 2005	Fishing villages (nos) NMFS 1980	Fishing villages (nos) NMFS 2005	Fisher population NMFS 1980	Fisher population NMFS 2005
West Bengal	47	44	303	346	83 561	2 69 565
Orissa	56	57	236	641	1 17 144	4 50 391
Andhra Pradesh	379	271	453	498	3 26 304	5 09 991
Tamil Nadu	375	352	422	581	3 95 903	7 90 408
Pondicherry	27	26	27	28	25 312	43 028
Kerala	222	178	304	222	6 39 872	6 02 234
Karnataka	105	88	147	156	1 12 893	1 70 914
Goa, Daman & Diu	54	41	61	61	39 912	39 973
Maharashtra	182	152	315	406		3 19 397
Gujarat	173	123	179	263	1 52 015	3 23 215

Note: Maharashtra data are taken from Handbook on Fisheries Statistics 1977

Trawlers account for 39.6% of the mechanised craft, gillnetters for 31.3 percent, dolnetters for 19.2 percent. Gujarat (4 300), Tamil Nadu (3 274) and Maharashtra (2 526) are leaders in trawlers owned by fisherfolk, while West Bengal, Maharashtra, Gujarat and Orissa account for the bulk of the gillnetters. Of the 52 971 motorized craft owned by fisherfolk, 48 percent are fibreglass boats. Plank-built boats account for 22 percent and catamarans for 20 percent.

Other salient features: Nearly 62 percent of fisherfolk families involved in fishing do not possess any craft, about 49 percent have no gear. Nearly 47 percent of the families possess neither craft nor gear. In the maritime states, Kerala has 66 percent of such families, followed by West Bengal (49%), Tamil Nadu (46%) and others. In 10 percent of the fisherfolk families of Maharashtra, only women take part in fishing or allied activities. At the all-India level, this figure is 5 percent. The housing pattern is enormously varied. The proportion of ***kutcha*** houses varies from 8 percent in Maharashtra to 91 percent in West Bengal. Kerala, Karnataka, Maharashtra and Gujarat are leaders in the number of primary educational institutions in fishing villages. In Kerala, Karnataka and Maharashtra, almost all fishing villages are electrified. West Bengal and Orissa languish at the bottom of this table.

Health infrastructure (number of primary health centres and hospitals) is unsatisfactory in West Bengal, Orissa and Andhra Pradesh. Kerala, Karnataka, Maharashtra and Gujarat lead in the number of financial institutions. As for boat-building yards, Kerala leads with 112, followed by Karnataka with 32. Kerala also has the largest number of freezing plants. According to the census, India has 399 processing plants and 471 cold storage facilities. There are 176 EU-approved processing and cold-storage facilities; also 303 units, both EU-approved and non-EU approved, that follow HACCP standards. This information is based on the data provided by the Marine Products Export Development Authority.

Table 2: Occupation status of fishers in India

State/ Union Territory	Full-time	Part-time	Occasional	Total working fishers	Fisher population
West Bengal	50 924	15 630	4 196	70 750	2 69 565
Orissa	74 980	34 315	11 987	1 21 282	4 50 391
Andhra Pradesh	1 09 644	13 008	15 962	1 38 614	5 09 991
Tamilnadu	1 85 603	15 954	5 351	2 06 908	7 90 408
Pondicherry	9503	401	437	10 341	43 028
Kerala	1 24 103	10 488	5 631	1 40 222	6 02 234
Karnataka	32 274	4 152	1 206	37 632	1 70 914
Goa	1 511	817	187	2 515	10 668
Maharashtra	54 901	12 484	4 689	72 074	3 19 397
Gujarat	68 956	10 185	4 181	83 322	3 23 215
Daman & Diu	5 600	194	74	5 868	29 305
Andaman & Nicobar	3 279	718	250	4 247	15 266
Lakshadweep	2 624	2 417	2 999	8 040	40 322
India	**7 23 902**	**1 20 763**	**57 150**	**9 01 815**	**35 74 704**

Glimpses into summary data (census in Andaman & Nicobar and Lakshadweep islands)

The Andaman-Nicobar group has 500 islands, a coastline of 1 912 km (one fourth of India's coastline) and a land area of 8 249 sq. km. The census here was launched on November 20 2005, in Port Blair. (The previous census was conducted in 1990.) It began with the training of 52 enumerators in Port Blair, most of them recruited from fishing villages and islands, educated up to higher secondary level or beyond. They obtained data from 100 marine fishing villages of Andaman-Nicobar, covering 3 275 fisher families.

Lakshadweep has 10 inhabited islands, a coastline of 132 km and a land area of 32 sq. km. Sixty-five enumerators selected in Lakshadweep covered the 10 inhabited islands for the census. Here are some of the findings.

Fisher population and occupation: The total fisher population of Andaman-Nicobar, from 3 275 families in 100 fishing villages, is 15 266. Of these, 13 098 live in 75 villages of Andaman, 2 168 in 25 villages of Nicobar. Diglipur in north Andaman has the largest number of villages (28), and the largest number of households (664). The average family size is 4.66. In the Nicobar group of islands, Car-Nicobar has the highest number of households (195), followed by Cambell Bay (124). Women form 47.23 percent of the population.

77.2 percent of the fisherfolk are full-time fishermen, 16.9 percent part-time, 5.89 percent occasional fishermen. Some 43.1 percent of the fisher population take part in fishing-related activities. Women engage in fish marketing, net-making and mending, fish processing and in labour operations. Only 7.92 percent of the fisher population were members of any society, fisheries or any other.

In Lakshadweep, the 10 inhabited islands have a fisherfolk population of 40 322 who belong to 5 381 families. Androth has the largest number of households (1 302), with a population of 9 994. The average family size is 7.49. Women form 48.03 percent of the population.

One-fifth of the fisherfolk population in Lakshadweep engage in fishing activities. One-third of the active fishermen are full-time fishermen, 30 percent are part-timers, the rest are occasional fishermen. Net-making and repair is the most popular fishing-related activity among men (27%); curing is the most popular among women, with 54 percent.

Religion: 85 percent of the population of Andaman-Nicobar are Hindus, 13 percent are Christians, 2 percent are Muslims. The entire fisherfolk population of Lakshadweep are Muslims.

Education: About 67 percent of the fisherfolk population of the Andaman-Nicobar group are educated, in Lakshadweep the figure is 76 percent.

In Andaman-Nicobar, 42.5 percent of the population are educated up to the primary level, 20.3 percent up to the secondary level, 4.3 percent above the secondary level. Comparative figures for Lakshadweep are 35 percent (primary), 45 percent (secondary) and 20 percent (above secondary).

Craft: There are 2 783 fishing crafts in the Andaman-Nicobar islands, of which 2 539 are in Andamans and 244 in Nicobar. Andamans has 165 mechanised crafts, 90.[illegible] percent of which are gillnetters; the others are trawlers and liners. There are no mechanized crafts in Nicobar. Andaman and Nicobar have 781 motorized crafts (97.8% of them in the Andamans) – mainly dugout canoes, catamarans, plank-built boats, ring seiners, FRP and ferro-cement boats. There are about 1 837 non-motorized boats – dugout canoes, catamarans, plank-built boats. Fisherfolk own 97.3 percent of the craft in Andaman, and 91.8 percent of the crafts in Nicobar.

Lakshadweep has 2 384 fishing craft including 667 mechanized craft (27.98%). Non-motorized craft account for 56.25 percent of the total. Most of the craft (2 275) are owned by fisherfolk. Of these, 26 percent are mechanised, 16 percent are motorized and 58 percent are non-motorized. Pole and line craft constitute 67 percent of those owned by fisherfolk. Kalpeni Island has the largest number of owned craft, with 894.

Gear: Gillnet and hook and line are the main fishing gear in the Andaman-Nicobar islands. Gillnet alone forms 78.8 percent of the total gear, followed by hook and line (15.67%), longline (1.2%) and others. Most of the gear are owned by fisherfolk. Shore seine is the only gear that is shared.

In Lakshadweep, the most popular gear are pole & line, gill nets, hook and line, shore seines and traps. Gill nets are used with 30 percent of the craft owned by fisherfolk, followed by hook & line (22.37%), troll nets (12.82%), seine nets (11.28%), pole and line (10.08%).

Infrastructure facilities: Seventy-six fishing villages in the Andaman-Nicobar group of islands are connected by road, 91 villages have electric power. Of the 59 hospitals and dispensaries, 41 are in Andaman, 18 in Nicobar. Most of the fisherfolk population live in ***kutcha*** houses. Almost all islands have schools that offer primary and secondary education; but colleges and technical institutes are found only in Port Blair. Most of the fisheries infrastructure is in Port Blair (three boat-building yards and two of the three freezing plants). The government has provided a deep freezer in every island for the benefit of fishermen.

In Lakshadweep, all the villages have been electrified and provided with medical facilities. 80 percent of the fisherfolk live in ***pucca*** houses. The UT has two technical institutes, three colleges, 16 secondary schools and 30 primary schools. There are two boat-building yards.

Sea safety programmes for artisanal and small-scale fishing communities: Role of gender

Chandrika Sharma, *Executive Secretary, International Collective in Support of Fishworkers (ICSF), Chennai, India*

Safety at sea: Improving the focus

Fishing is one of the riskiest occupations. Fishers everywhere are vulnerable to accidents, injuries and death. Some 24 000 deaths occur every year in fishing, besides an estimated 24 million non-fatal accidents annually.[1] In the developing world, accidents and deaths are frequent in small-scale fishing operations. Some of the reasons: inadequacies in safety and communication equipment, in search-and-rescue (SAR), and early warning services.

This paper discusses the role of gender in sea safety programmes for artisanal and small-scale fishing communities.

The gender-based division of labour in small-scale marine fisheries in developing countries is interesting: while men go fishing, women are busy processing and selling fish. But this scenario isn't uniform. In some places, the entire fisheries chain is male-dominated. It's the men who fish, sell and process the fish. In some other regions – Peru, Thailand, Philippines and the Pacific islands – women turn fishers, particularly in near-shore waters. Women have been traditional fishers in a few places. And in recent times, women have functioned as crew in fishing vessels – when vessel owners found it difficult to employ or pay male crew. It is common for women and children to engage in gleaning/ collecting/ gathering of seaweed, shellfish, etc – for domestic consumption or for sale.

This article is based on a presentation by the author at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, 1-4 February 2006.

A noteworthy fact: people engaged in shore-side activities – which do not require the use of fishing vessels – are rarely seen as fishers. They therefore fall outside the ambit of instruments/ programmes aimed at improving sea safety or conditions of work. At the 93rd Session of the International Labour Conference (ILC) that discussed the proposed ***Convention on Work in the Fishing Sector***, the ICSF stressed the need to broaden the definition of a 'fisher' and thereby promote the rights of those undertaking commercial beach-seine operations, diving and gleaning – activities that do not necessarily involve the use of fishing vessels. There can be little doubt that the nature of work performed exposes this sub-group to specific hazards.

In the severe cyclone that hit Orissa, India, in November 1996, 2 560 people lost their lives, of whom as many as 1 435 were fishers. Six hundred of these died on mechanized boats at sea; 830 others were out in inshore waters collecting shrimp seed (Salagrama, 2002)[2]. The shrimp seed collectors – women, children and men – had been away at sea before the cyclone started and had received no warning about the impending cyclone.

There are also several reports that indicate that, as coastal ecosystems face greater degradation and pollution, the health risks to those who collect/ fish in the backwaters, mangrove habitats and other coastal areas are increasing. Specific attention clearly needs to be paid to addressing the safety and health problems faced by those working in this transitional zone that exists between land and sea.

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[1] *ILO (2000): Safety and Health in the Fishing Industry: Report for discussion at the Tripartite Meeting on Safety and Health in the Fishing Industry, Geneva, 13-17 December 1999, International Labour Office.*

[2] *Salagrama, Venkatesh (2002): Reading the Perfect Storm, SAMUDRA Report, July 2002.*

Safety at sea programmes thus need to directly address the safety and health not merely of men and women who fish on board small-scale fishing vessels, but also of those who fish in coastal and inshore areas, often without fishing vessels. An understanding of some of the problems specific to women in the fishing sector would be an important prerequisite for the better design of these programmes – relating, for example, to sanitation facilities, the ability to swim, etc.

Safety at sea: A community approach

In many parts of the world, fisheries is as much a way of life as a profession. Entire communities depend on the sector. An accident at sea has repercussions within the family and the community. There are many documented cases, particularly from the industrialized world, where women from fishing communities have organized themselves to draw attention to issues of safety at sea. They have demanded action by governments to improve working conditions and safety.

Example: The foreword of the book *'Turning the Tide: The 1968 Trawler Tragedy and the Wives' Campaign for Safety'*[3], by Rt. Hon. John Prescott MP, draws attention to a unique kind of political struggle that took place in the UK in 1968. The book is the story of their effective campaign for improved safety at sea.

"I was present at the wives' meeting in Victoria Hall on Hessle Road that cold night in February 1968. It was not the kind of political meeting I was used to attending. Outside were prams, and inside, the hall was packed with women holding children and babies. Their grief was almost unbearable to witness. This was a meeting where political struggle was being experienced not as theory or ideology, but at the level where it mattered most—in the heart of a community that saw itself under threat and was determined to effect change."

This meeting was organized in the aftermath of the trawler tragedy in 1968, when three Hull trawlers sank and lost 58 men. The women of the Hessle Road community decided that they would no longer accept the loss of their men as an accident of nature.

There are several other examples. In Iceland, from the earliest times, women from fishing communities were active in the Icelandic Association for Search and Rescue (IASR) established in 1929. They drew attention to safety issues, to promoting Search and Rescue (SAR) groups for fishing communities around the coast[4]. They also strove to raise funds for equipment needed to facilitate search and rescue.

Women were very active in the Norwegian Society for Sea Rescue (NSSR), a nationwide humanitarian and voluntary organization formed primarily to save lives and property at sea, and to provide various forms of assistance along the Norwegian coast. Similarly, the Gloucester Fishermen's Wives Association in Massachusetts, United States, is represented on the national advisory committee concerned with fishing safety.

In the developing world as well, women have been drawing attention to safety issues. A meeting of women of fishing communities in Northern Chile, for example, organized through CONAPACH, the national fishworker organization in Chile, stressed the need to deal with the high accident rates among divers in Chile and the need to use decompression chambers[5]. In Asian countries, the struggle by fishing communities against bottom trawling is partly linked to the loss of life and property resulting from collision/ conflicts of their vessels with trawlers in inshore areas. Women have often taken an active part in these struggles. In Sumatra, Indonesia, women who have been widowed because of collisions/ conflicts between small boats and trawlers have attempted to organize themselves as part of the ***Sarekat Nelayan Sumatera Utara*** (SNSU)[6]. They have urged that the ban on trawling must be properly enforced.

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[3] *This book by Rupert Creed, has been edited by Sara Hawkins and published by Back Door Press (1998).*

[4] *Petursdottir, G., Hannibalsson, O., Turner, J.M.M (2001): Safety at Sea as an integral part of fisheries management. FAO Fisheries Circular No. 966, Rome, FAO, 2001.*

[5] *Jéssica Alfaro Alvarez (2001): Women Weaving Networks, Yemaya No 7, August 2001.*

[6] *Sharma C (2000): Skirting the ban. Yemaya No. 3, March 2000.*

Administrators keen to promote the use of safety equipment and a culture of safety and conscious of the fact that men are away at sea and difficult to reach, have sometimes, but not often enough, aimed safety awareness campaigns not only at fishermen but also at their spouses and family members.

Safety at sea: Getting the larger picture

The following are extracts of a report[7] from the forum on "Working Conditions and Safety at Sea and Ashore" organized during the AKTEA Conference, ***Women in Fisheries and Aquaculture: Lessons from the Past, Current Actions and Dreams for the Future*** which took place during 10-13 November 2004 in Santiago de Compostela, Spain. The Conference brought together 170 fisherwomen, shellfish gatherers, fish processors, fish sellers and researchers, administrators, social workers and women organizers.

The issue of safety on the boats was discussed. Women felt that men's attitude towards safety matters is driven more by machismo than by the need for family security. Women face problems in convincing the men to use safety equipment.

Some of the participants (from Portugal, Spain and France) felt that the European fishing fleet needs improved safety measures. They underlined the importance of financing the construction of new vessels with the necessary safety standards.

Deteriorating working conditions were seen as another reason for accidents at sea. These resulted from the decrease in the number of crew on board the vessels, and the longer working hours, enforced because boat owners need to economize to meet with rising investments, decreasing fish prices and higher debts. Alcohol and drug consumption on board boats were also responsible for accidents.

Fisherwomen awaiting the return of their menfolk from a fishing trip.

Some of the forum participants (from Canada, Ireland and Norway) felt that increasing the cost of insurance may encourage more safety practices, but also place a burden on small businesses and fishing enterprises.

It was furthermore discussed that women should demand the recognition of occupational illnesses of not only men but also women working at sea, shellfish gatherers, fish sellers, etc. In Canada, shellfish processing workers are struggling with occupational asthma and with cumulative trauma disorders (like carpal tunnel syndrome).

The women delegates drew attention to technical aspects of sea safety (need for new vessels built according to safety standards), as well as to social and economic aspects responsible for compromising safety on board.

They stressed that issues of safety at sea have to be seen from a technical as well as from a social, economic and resource perspective. They said that women from fishing communities often have a direct livelihood stake in these discussions; as fisheries moves towards energy and capital-intensive forms, women with little access to capital are often ousted from the sector.

What appears to be important, therefore, is a mechanism for dialogue between administrators and fishers to identify the entire range of issues that have a bearing on sea safety. Clearly, the issues involved are complex and linked to those of fisheries resources management and the very model of fisheries development being espoused.

Women from fishing communities, experiencing social and economic pressures in very direct ways, are well placed to take part in this dialogue. They should be encouraged to take the initiative to propose measures for a fishery that is sustainable and that ensures better returns to small-scale fishers and their communities.

And finally, there is a strong case for adopting a comprehensive approach towards reducing the vulnerability of coastal fishing communities to natural disasters on the sea and on land. There is also a strong case for integrating sea safety programmes with community-based disaster preparedness programmes.

This is especially because fishing communities in the developing world, occupying the very margins of the land mass as it were, are continually exposed to natural disasters. The December 2004 tsunami is a recent and dramatic example.

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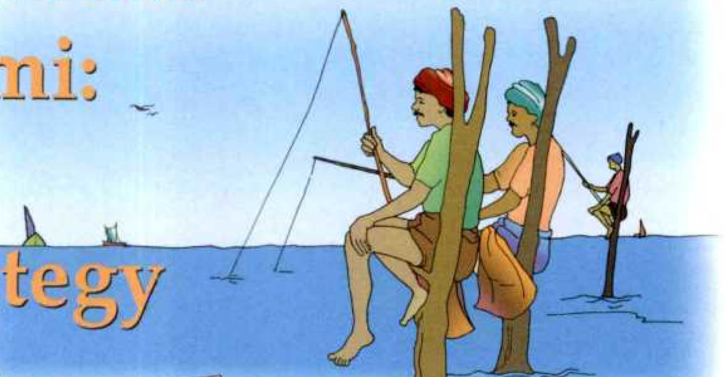
[7] *Quist, C and Frangoudes, K. A Sea of Women (2005): SAMUDRA Report 41, July 2005.*

Rebuilding Fisheries after the Tsunami: Highlights of Sri Lanka's Strategy and Programme



An outline of the plan to rebuild the fisheries sector – in the short-term and the long-term.

How can Sri Lanka "build back better" after the havoc of the December 2004 tsunami? A strategy and a programme have been devised for post-tsunami reconstruction and development in marine fisheries by the Ministry of Fisheries and Aquatic Resources (MFAR) with FAO support. Details of the programme have been published in a 76-page booklet. It will help efficient coordination and utilization of relief effort by governments, UN agencies, NGOs and others. Highlights of the strategy and the programme are summarized here.

Impact of the tsunami

Some 35 000 people in Sri Lanka perished in the tsunami, and nearly half a million people lost their livelihoods. Thousands of houses collapsed, three-fourths of the fishing fleet of approximately 32 000 boats were damaged. (The cost of boat and gear repair and replacement is estimated at US$ 57 million). Large urban fish markets and many retail outlets sustained heavy damage; so also did some 200 fish landing sites, 10 fishery harbours and 37 anchorages plus associated ice plants, cold stores, buildings and vehicles in the affected areas. Coastal habitats, particularly coral reefs, mangroves and coast protection structures suffered varying degrees of damage.

Extensive havoc was caused to many fishery-related institutions – buildings, assets, training vessels, research tools.

Fish production in 2005 (statistics not available yet) was perhaps about 46 per cent lower than in 2004. Foreign exchange earnings from fish exports (particularly species such as ornamental fish, lobster, grouper, chank and *beche de mer*) were substantially lower.

Goals of reconstruction

The government wants to use the challenge of reconstruction as an opportunity to "build back better," to create a world of fisheries and fishing communities better than it was before the tsunami.

The goal of the strategy is to provide fishing communities with more secure livelihoods, higher standards of living, better protection from natural disasters and safety at sea, better risk insurance, restoration and conservation of the fisheries resources and of the marine and coastal environment.

The strategy stipulates as essential sustainable management of Sri Lanka's fisheries and coastal zones; it seeks to restore private assets, rebuild and enhance public goods; and improve governance of the fisheries sector by public agencies at all levels.

Several agencies will play a pivotal role in the programme – the Department of Fisheries and Aquatic Resources (DFAR), the Department of Coast Conservation (CCD), the National Aquatic Resources Research and Development Agency (NARA), National Aquaculture Development Authority (NAQDA), and the National Institute of Fisheries and Nautical Engineering (NIFNE).

The fisheries reconstruction and development programme will be coordinated by the Programme Coordinating Unit in the MFAR. It will also establish an overall monitoring and evaluation system, and guide project-level implementation.

Key Guiding Principles

Key Guiding Principles have been enunciated for both short-term and long-term reconstruction. They are as follows:

- Provide the basis for sustainable management and development of the fisheries and aquaculture sectors;
- Ensure that reconstruction and development efforts are perceived by local communities as a right and addressed in a compassionate manner;
- Adopt a livelihoods approach;
- Adopt a coordinated and transparent approach;
- Promote the enhancement and conservation of coastal and aquatic resources through integrated and participatory management; and

- Ensure compliance with international and regional conventions, agreements and guidelines (such as the UN Convention on Law of the Sea, FA0 Code of Conduct for Responsible Fisheries, UN Fish Stocks Agreement, FA0 International Plans of Action (IPOAs) and others.

The Short-Term Programme

The short-term rehabilitation and reconstruction programme will build upon and complement ongoing humanitarian and recovery work that started in January 2005. It will focus on repair and replacement of damaged and lost fishing boats and gear; re-establishment of fish processing, distribution and marketing chains; and capacity strengthening for reconstruction and development at all levels.

Rehabilitation activities needed urgently at the village level include repairs to damaged village roads, clearing of beaches from debris, cleaning up of drainage canals, planting mangroves, etc.

Infrastructure facilities to be provided should include basic facilities such as water, electricity, communication, health, etc; community recreational facilities, libraries, pre-schools and vocational training centers; and warning systems including public access corridors and roads for quick evacuation at times of future natural disasters.

The short-term reconstruction programme will cost an estimated US$ 78.43 million (Table 1). The details of the short-term programme are as follows.

1) Repair and replacement of damaged and destroyed fishing craft and gear: While high priority is given to repairing damaged craft, and to replacing boats destroyed and fishing gear lost to enable fishers to resume fishing quickly, boat replacements shall not be allowed to lead to an uncontrolled intensification of fishing effort and worsening resources overexploitation.

District-level coordination and information exchange between boat suppliers and fisheries officials shall be promoted to ensure that the number of vessels will not exceed that before the tsunami. Replacement of boats will require entitlement certificates issued to fishermen. New boat manufacturing facilities will not be encouraged so as to avoid over-capacities.

To satisfy essential safety standards for new boats, the present boat-building practices and standards shall be reviewed and minimum standards for design and construction shall be introduced.

Table 1: Cost estimates for short-term rehabilitation

Programme Activity	Year and cost (LKR million) - if applicable -		
	2005	2006	Total
Repair and replacement of fishing craft and gear	3043	2641	5684
Re-establish private fish retail outlets and municipal fish markets	10	44	54
Re-establish the fish landing facilities at fishery harbours, anchorages and landing sites	10	21	31
Rehabilitate damaged coast protection structures and coastal habitats	40	900	940
Re-establish essential institutional support services and facilities		822	822
Capacity building in support of district-level planning and implementation		128	128
Promotion of sustainable fisheries management		141	141
Institutional strengthening		43	43
Total	**3103**	**4740**	**7843**

Provision of fishing gear will be in accordance with existing regulations. Gear suppliers will be discouraged from delivering nets and other fishing gear that are harmful to the resource and/ or environment.

2) Re-establish private fish retail outlets and municipal fish markets: Financial, technical and logistical support is necessary to help a large number of small players – fish stall owners, bicycle and motorcycle fish vendors, other traders – to re-establish themselves in business. Minimum hygienic requirements for fish marketing should be met to ensure food safety and improve food quality. To improve temporary storage facilities, unhygienic wooden boxes will be replaced as containers by durable plastic boxes. Better access roads are needed from landing places to main roads, especially along the east coast; and quality water for making ice.

There is an urgent need to re-establish the three fish market at Galle, Matara and Hambantota, which were completely destroyed. Grants, debt relief or new loans will be considered for reconstruction of privately owned fish retail outlets and the network of cycle/ motor-cycle vendors.

3) Re-establish fish landing facilities at fishery harbours, anchorages and landing sites: The formulation of a master plan for fishing harbours, anchorages and landing sites will be accorded high priority.

Establishment of adequate public access to the beach has been identified as an urgent need, the lack of which hampered evacuation of people from beaches during the tsunami. While there is a need to relocate man-made infrastructure (hotels, residences) located in the no-build reservations and other highly sensitive areas, 'reconstruction/ development' activities within the sensitive coastal reservation areas including low-lying beaches will be regulated under the framework of the Coastal Zone Management Plan.

4) Re-establishment of essential institutional support services and facilities: Damaged infrastructure of government support services and agencies needs to be quickly restored to enable the reconstruction process. This includes the reconstruction of district fisheries offices, restoration of laboratories, repair or replacement of research and surveillance vessels (NARA), scientific equipment and radio communication systems, and training vessels and demonstration equipment (NIFNE).

To strengthen the livelihoods and earnings of fishers, R & D activities will aim at tapping under-exploited resources, at increasing the participation of women in fisheries activities, promoting income-generating activities, and improving fish processing and marketing. It is recognized that the early rehabilitation and management of coastal habitats is vital to the sustainability of the fishing industry.

5) Capacity-building in support of district-level planning and implementation: District offices of DFAR will have a pivotal role in the programme. They will have to streamline operating procedures, including effective communications, capacity building and support systems. The responsibilities of the local administration under the programme would include:

- Organizing meetings and detailing procedures for prioritizing, planning, implementing and coordinating reconstruction and development programmes with fishing communities;
- Strengthening fisheries co-operatives and other local organizations;
- Providing assistance in project planning and implementation;
- Improving communications systems, including television and radio broadcasting, video and printed material;
- Coordinating improvements to access roads, fish market infrastructures, potable water supplies and other amenities;
- Ensuring training that includes disaster warning, management systems and practices in coastal areas;
- Ensuring efficient credit operations for programme beneficiaries, particularly women, to undertake family supplemental income activities; and
- Ensuring programme monitoring and impact assessment.

To achieve this, the facilities, capabilities and services of DFAR and CCD personnel at district levels will be further strengthened to allow them to play a proactive and supporting role. An institutional needs assessment will be carried out at DFAR and other agencies.

6) Sustainable fisheries management: Sri Lanka has a long history of heavy investment in shore-based fisheries infrastructure (including harbours, landing sites and boats), but catches per unit effort have been modest, as fishery resources (especially inshore) have been over-exploited. A closer analysis is needed of the maximum sustainable yields of the main commercial species, the ideal fleet size and composition, and the required institutional facilities and human capacities for fisheries management at all levels. Improvements are needed in fish catch monitoring, licensing and regulating fishing crafts, use of fishing gear, surveillance of exclusive fishing zones and the boundaries of fishing areas under the jurisdiction of local governments.

7) Institutional strengthening: To implement the planned reconstruction and development programmes as well as to achieve competent technological standards, some of the Ministry's agencies such as DFAR and NARA need strengthening through capacity building, state-of-the-art technologies and facilities, and programme monitoring.

There is an urgent need to rehabilitate the quality control laboratory at NARA. This will help exporters meet the rigorous quality standards of shrimp and tuna in American and EU markets. Planners and policy-makers, fishers, fish traders and exporters will benefit immensely from a trade and market information system that incorporates basic fisheries data.

Over the years, agencies such as NARA, CCD, NIFNE and DFAR have lost experienced staff through retirement or resignations while recruitments have been minimal. Capacity-building and training are essential so that these agencies recover from the devastation of the tsunami and fulfill their mandates.

Medium/ Long-term Programme: The medium and long-term development programme will focus on improving the livelihoods of fishing communities beyond pre-tsunami levels. It will promote economic diversification and sustainable utilization and management of coastal resources. It is envisaged that this phase will be completed in 2009.

1) Strengthening communities and their productive activities: The scope for further increases in marine catch is limited. The focus has to be in the following areas:

- value-addition through improved onboard and onshore post-harvest practices and fish processing;
- increased profitability of fish harvesting through effective fisheries management that prevents economic waste;
- better designs for multi-day boats to improve operational efficiency, product quality, and safety at sea;
- prevention of over-fishing, restoration of fish stocks and protection of critical fish habitats; and
- promotion of economic diversification through aquaculture development and tourism-related services.

Fisheries cooperatives will be strengthened through better facilities in fish handling, training in skills development, and credit schemes.

Table 2: Cost estimates for medium to long-term development

Programme Activity	Year and cost (LKR million) - if applicable -			
	2007	2008	2009	Total (Preliminary)
Strengthening communities and their productive activities	96	228	91	415
Reconstruction and modernization of fishery harbours and anchorages	1 827	1 450	420	3 697
Sustainable coastal area management	1 000	1 000	560	2 560
Total	**2 923**	**2 678**	**1 071**	**6 672**

The programme to help fishing communities will give priority to women.

Specific training for coastal communities will promote value-added fish products and better handling and processing of fish and the utilization of fish waste to prepare marketable products such as poultry feed and handicraft, particularly by women's groups.

The MFAR will seek to strengthen interaction of coastal communities with humanitarian and technical NGOs as well as private companies.

2) Reconstruction and modernization of anchorages and fishery harbours: The Ceylon Fishery Harbours Corporation (CHFC) has prepared detailed cost estimates for re-establishing 37 anchorages and rebuilding 10 fishery harbours. A master plan for the reconstruction of anchorages and landing facilities will be developed and implemented in co-operation with the fishing communities. Several donors have already taken on responsibility to repair damaged harbours.

3) Sustainable fisheries management: During the short-term phase the focus is on creating management awareness and avoiding excessive fleet size. Medium and long-term activities will focus on strengthening institutional structures and capacities for routine fisheries management (vessel registration, fishing licensing and community-based management systems). Current MCS (monitoring, control and surveillance) activities are ineffective. These must be strengthened and expanded – more patrol boats, better infrastructure facilities, higher manpower skills.

High priority will be accorded to a rapid assessment of fish resources in the wake of the tsunami and to the proposed comprehensive fish resources survey to be funded by SIDA and NORAD. A comprehensive evaluation of fishing practices in each district will then be undertaken, so that management needs and strategies can be determined on the basis of resource survey findings.

Priority will be given to technologies to reduce post-harvest losses through improved onboard and onshore handling practices, and to development of value-added products.

To ensure participatory fisheries management, plans with clear objectives and responsibilities need to be developed for each of the managed fisheries. A management plan is also needed for the offshore fishery that will be compatible with regional management needs.

4) Sustainable coastal area management: Many natural coastal habitats such as mature sand dunes, mangrove belts, coral and sandstones, reefs at one time functioned as effective barriers to reduce the impact of cyclones and tsunamis. Participation of coastal communities will be enlisted to protect these coastal habitats from destructive human activity.

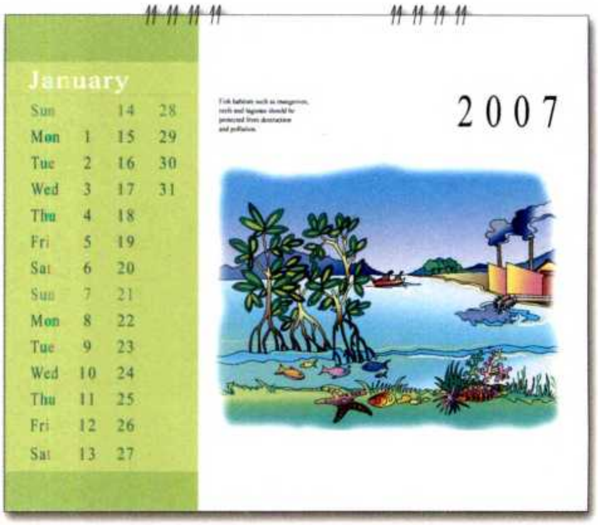
The CCD has identified critical sites to be managed under Special Area Management (SAM) plans, with the active participation of coastal communities and other stakeholders.

5) Capacity-building in support of planning and implementation: Activities will build on and complement ongoing work started during the short-term phase. Mid-level cadres of the MFAR and the DFAR should be built up as a matter of high priority. At the district-level, officers of DFAR, CCD and other fisheries agencies need to be supported with logistics, transport and communication facilities.

Cost estimates The medium to long-term reconstruction programme will cost an estimated US$ 88.85 million (Table 2).

Boat replacement and repair – an important part of short-term tsunami rehabilitation.

BOBP's 2007 calendar promotes the Code of Conduct for Responsible Fisheries



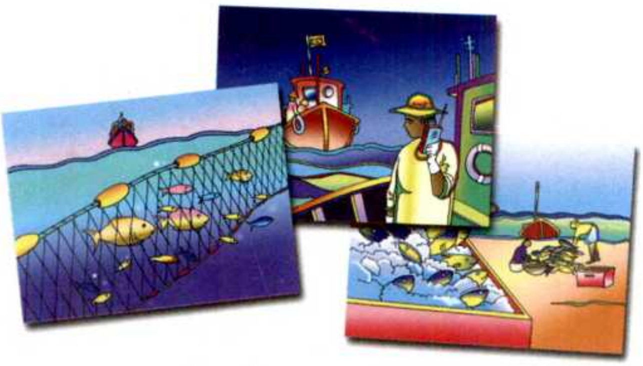
Is the Code of Conduct for Responsible Fisheries too abstract, too philosophical, too difficult for fishers to follow? Look out for the BOBP-IGO's 2007 calendar, which gives visual shape to the Code – through simple, attractive sketches and equally catchy messages.

The Code was adopted in Rome by 170 member-countries of the FAO in 1995. It is a collection of principles, goals and action elements. It covers just about everything relating to fisheries – the capture, processing and marketing of fish stocks, their management, and aquaculture.

Everyone agrees with the Code – as they would with motherhood or patriotism. But compliance is voluntary, not mandatory. Fishers, boat owners, even governments have yet to take action or change their practices to conform to the Code.

New habits and attitudes are slow to develop. The BOBP-IGO's workshops and publications on the Code have been useful for officials. But thousands of small-scale fishers still haven't heard of the Code.

Hence the 2007 calendar. It conveys the messages of the Code through sketches, headings and simple text. Avoid overfishing. Keep the fleet size right. Do away with destructive fishing practices. Use selective fishing gear and methods; avoid small-mesh nets and catch-everything gear. Ban dynamiting, poisoning and other destructive fishing practices. Protect and promote fish habitats. Enhance fish stocks with artificial reefs. Ensure people's participation in planning and tapping coastal resources. Cut post-harvest losses. Ensure safety at sea and the health of fishers. Collect and record data systematically – on fish landings, species, sizes… Make every harbour a haven for fishing vessels, with facilities for vessels, vendors and fish buyers. Introduce co-management. Avoid and combat pollution.



BOBP's annual theme-based desktop calendars have been in high demand – significant content, handy size, visual appeal. The 2007 calendar should be a hit too. The text is in English. We would like to consider vernacular versions – donor support would be welcome!

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation(BOBP-IGO).The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

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Small-scale fisheries

Managing the unmanaged

Can we manage small-scale fisheries? Can we afford not to? This issue examines a spectrum of challenges at many levels - ranging from strategies for the future to safety at sea, and strong political commitment to help the small-scale fisherman.

ommittee on Fisheries Examines arious Global Problems at 7th Meeting in Rome 5

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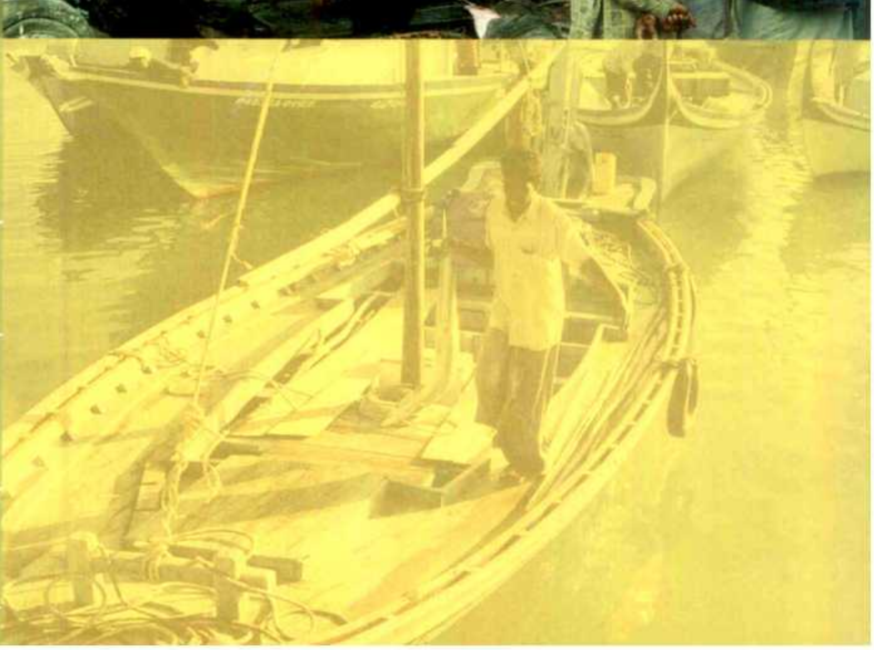
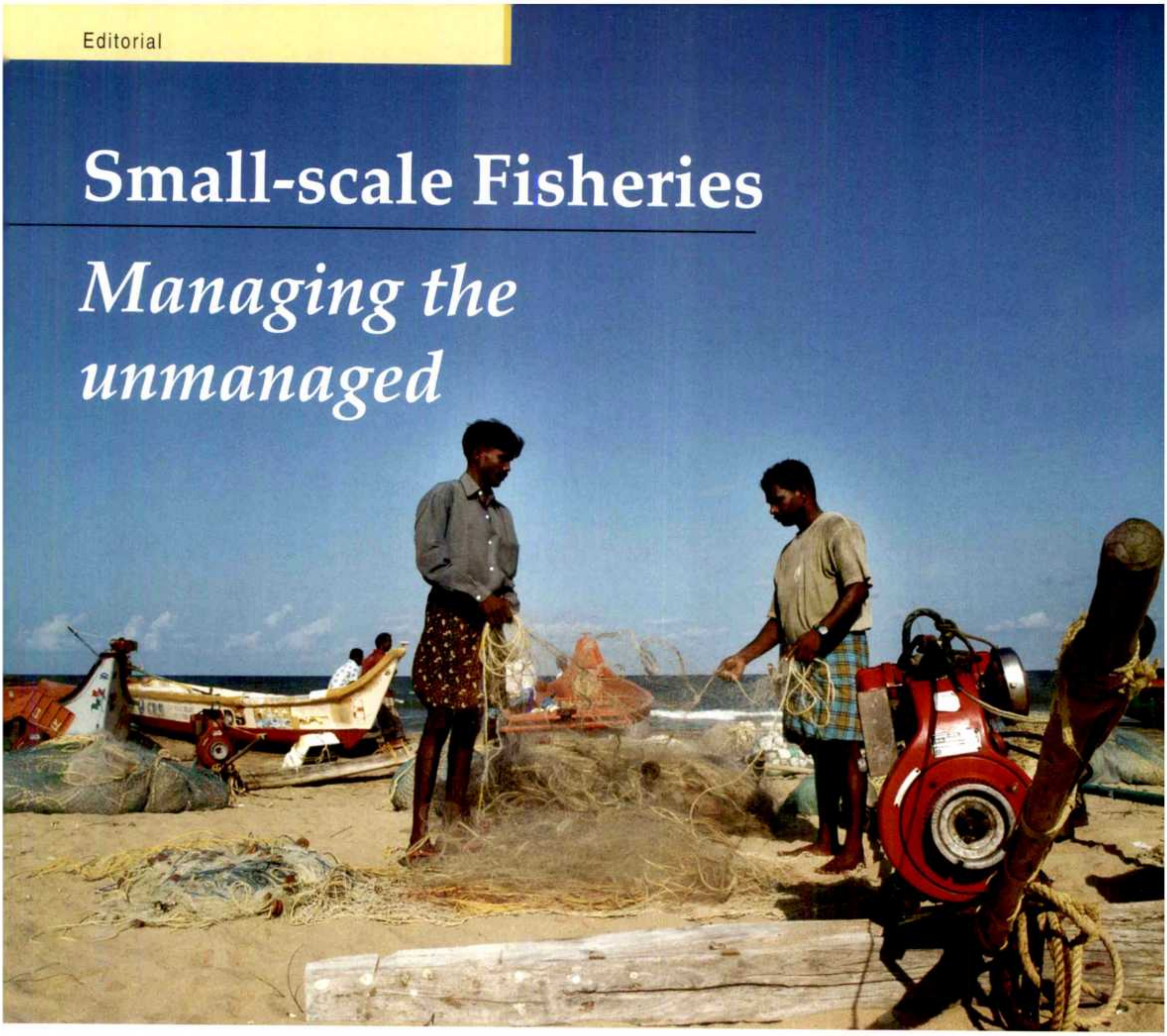


Small-scale Fisheries

Managing the unmanaged



Managing small-scale fisheries is a major challenge for the global community. Enough has been said about their plight. What needs to be done and how?

Small-scale fisheries was debated intensely at the recently concluded meeting of the Committee on Fisheries (COFI) in Rome. The subject aroused great interest also in previous meetings of COFI. But there was a tone of intensity and urgency at the latest meeting, the 27th – as the report on pages 5 to 8 of this issue of ***Bay of Bengal News*** shows.

A majority of COFI's members strongly urged the setting up of a dedicated COFI sub-committee or a specific work programme on small-scale fisheries to address the long-term developmental needs of small-scale fisheries.

This suggestion has merit. Small-scale fisheries is one of the most un-organised and unmanaged areas in global food production.

How big is small-scale fisheries?

Some 38 million people worldwide are fishers and fish farmers, according to the FAO document 'State of world fisheries and aquaculture, 2004'. Of these, 26 million are into capture fisheries (marine and inland), the remaining in aquaculture. Over 78 million people are dependent on small-scale fishing and ancillary activities such as processing, trade, etc. for their livelihoods. These estimates exclude the millions of people who are temporary fishermen in marine areas and elsewhere.

How unmanaged is small-scale fisheries?

So un-managed that even a precise definition is elusive. An expert consultation on small-scale fisheries in 1975 proposed a 53-word omnibus definition. Another FAO group in 2005 concluded that it would be inappropriate to formulate a universally applicable definition for small-scale fisheries. It described the sector on the basis of the range of characteristics that are likely to be found in any particular small-scale fishery (see box on opposite page).

What are the problems of small-scale fisheries? They are very many, as pointed out in the FAO paper "Social issues in small-scale fisheries"

Defining small-scale fisheries

According to an expert consultation on small-scale fisheries development held in 1975 in Rome, "Small-scale fisheries are labour-intensive, and are conducted by artisanal craftsmen whose level of income, mechanical sophistication, quantity of production, fishing range, political influence, market outlets, employment and social mobility and financial dependence keep them subservient to the economic decisions and operating constraints placed upon them by those who buy their production."

According to the FAO Technical Guidelines for Responsible Fisheries, No.10 ("Increasing the contribution of small-scale fisheries to poverty alleviation and food security," Rome 2005), small-scale fisheries can be broadly characterized as a dynamic and evolving sector employing labour-intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources. The sub-sector (conducted full-time or part-time, or just seasonally), aims at supplying fish and fishery products to local and domestic markets, and to meet subsistence consumption.

Export-oriented production has increased in many small-scale fisheries during the last one to two decades because of greater market integration and globalization. Typically, men engage in fishing and women in fish processing and marketing, but women are also active in near-shore harvesting activities while the men are known to engage in fish marketing and distribution as well. Other ancillary activities such as net-making, boatbuilding, engine repair and maintenance, etc. can provide additional fishery-related employment and income opportunities in marine and inland fishing communities.

Small-scale fisheries operates at widely differing organizational levels – ranging from self-employed single operators through informal micro-enterprises to formal sector businesses. This sub-sector, therefore, is not homogenous within and across countries and regions. This fact must be taken note of when formulating strategies and policies for enhancing the contribution of small-scale fisheries to food security and poverty alleviation.

– Poverty, harsh living and working conditions.

– Weak organisational structure, no social security.

– Lack of access to credit, particularly public finance, dependence on exploitative money-lenders

– Hazard to life and limb at sea through fishing vessels that lack basic safety standards and safety equipment. Vulnerable to floods and cyclones, and to the vagaries of climate change.

– Exclusion from access to other employment opportunities, to health and social services, to roads, markets and other infrastructure. Excluded from participation in social and political processes, and in development planning.

– Diminishing fish stocks and biodiversity. Increasing competition with other users of coastal resources, conflicts with the industrial fishing

What's the solution? How do we go about it?

Some of the problems listed above are unique to fishers, but many are common to all rural populations. Managing them call for a slew of measures. They demand a combination of resources, political commitment plus political, economic and social reform.

The BOBP-IGO believes, however, that five measures are critical.

- **Open access** is the bane of small-scale fisheries. It leads to fleet overcapacity, indiscriminate overfishing and resource degradation.

A rights-based system of access is needed that respects the interests of both present and future generations, ensures sustainability of resources and optimizes benefits to fishing communities. This is of course easier said than done, but the process must be set in motion.

Such a system would vary from country to country, and within a country as well, depending on the ethos of the community, the resources available, the composition of resource users.

- Fishing communities need **social services** – relating to education, health, housing, insurance, access to government schemes, etc. – which are provided by government departments other than fisheries. Inter-sector co-operation is essential so that fishers can get these benefits.

- **Credit and public finance** are a part of the social services mentioned above, but need special mention because of their importance for fisherfolk communities. Simple and convenient access to credit can make all the difference between self-reliance on the one hand, destitution on the other.

While lack of credit has usually inhibited development of small-scale fisheries, excess flow of capital has contributed to over-capacity. This happened recently with the tsunami reconstruction drive.

- **Introduce the stakeholder approach to fisheries management** and resource sustainability. The fishing resource is under pressure everywhere, with some exceptions, and sustainability is being endangered. The rationale of the stakeholder approach is that legislation alone can't bring about management, even persuasion cannot. The active co-operation of a number of stakeholders – fishers, the public, fish vendors, retailers, processors, wholesalers and exporters, government departments and scientists, the media, social scientists and biologists, perhaps international organisations and donors – is essential. Representatives of all stakeholder groups come together, discuss individual and collective perceptions of the problem, analyse them and come up with options.

The stakeholder approach to management is participatory. It can be slow. But it is steady, sure and systematic. It not merely widens awareness, it narrows differences, reconciles conflicting viewpoints, facilitates solutions.

During the BOBP's third phase, the stakeholder approach to management was used to tackle an impressive diversity of management problems. To cite an example, community-based fisheries management (CBFM) in Thailand. CBFM came into force in 110 fishing villages of Phang Nga bay whee resource stress was a serious problem. The package of CBFM measures included a ban on trawls and push nets within 3 km of the shoreline; construction and installation of community spawning cages; culture of finfish, oysters and mussels; voluntary surrender of resource-damaging push nets by fisherfolk in return for gillnets; installation of artificial reefs to keep out trawlers; mangrove reforesting and sea ranching; construction of a floating pontoon on the sea; setting up of a community learning center; enrolment of fishermen themselves as voluntary rangers to monitor fisheries and ensure compliance with management effort. The project was a huge success.

The stakeholder approach was also used with ornamental fisheries in Sri Lanka; reef fisheries resource management in the Maldives; tackling the resource problems posed by two fisheries in Bangladesh (push nets and set bagnets) that employed thousands of subsistence fishers; participatory training of fisheries officials in Tamil Nadu, India; tackling shrimp culture problems in Andhra Pradesh, India; use of PRA as a tool for data collection and analysis in West Bengal, India; setting up of a marine park in Malaysia.

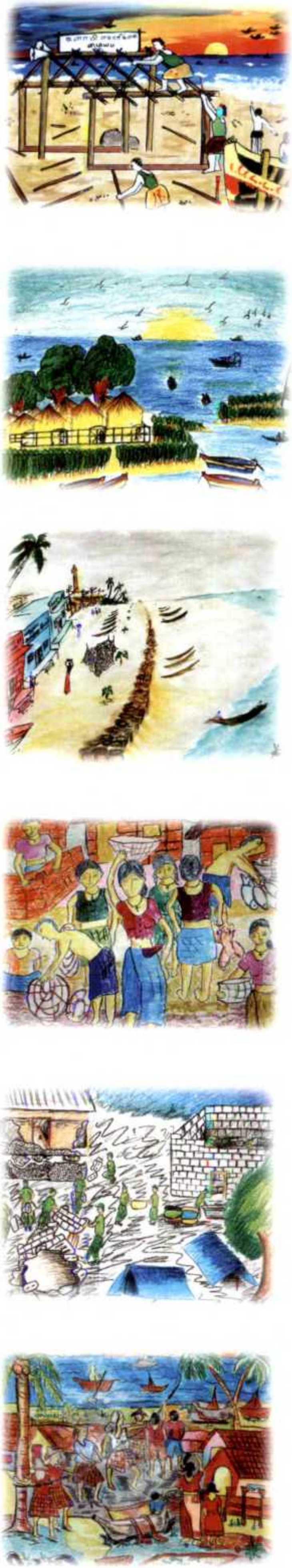
The fragile nature of small-scale fisheries may make drastic management changes difficult. New management approaches, locally relevant and appropriate, need to be tried.

- **Empowerment of small-scale fisherfolk communities:** Social and economic empowerment have been discussed above, but political empowerment is even more critical. Self-help groups of men and women, co-operatives and other forms of organisation would catalyze action and serve as forums for co-operation with government and other institutions, for expression of grievances, for problem-solving.

In sum, managing of small-scale fisheries is a large-scale challenge. It can be undertaken by the government only through a stakeholder approach that involves social scientists, biologists, the media, and the fishers themselves.

A COFI Sub-committee on small-scale fisheries may provide critical inputs into understanding of present problems, but the burden of action has to be shouldered largely by governments worldwide. Political will and commitment are crucial. Other action is often quick to follow.

– Y S Yadava



Paintings by school children in India, Maldives and Sri Lanka depicting post-tsunami reconstruction.

Committee on Fisheries Examines Various Global Problems at 27th Meeting in Rome

FAO Headquarters, Rome

A summary of the discussions and decisions of the 27th session of the FAO's Committee on Fisheries, which met in Rome early in March.

The 27th session of the FAO Committee on Fisheries (COFI) was held from 5 to 9 March, 2007 at the FAO headquarters in Rome. Senior government officials from more than 100 countries plus observers took part. Mr A Hettiarachchi of Sri Lanka chaired the meeting.

The Committee on Fisheries (COFI), a subsidiary body of the FAO Council, was set up in 1965 at the 13th session of the FAO Conference. The Committee provides a global forum to review the FAO's programmes, examine major issues in international fisheries and aquaculture, and negotiate global agreements and instruments.

The 27th session discussed progress in the implementation of the FAO Code of Conduct for Responsible Fisheries (CCRF); rehabilitation of fisheries and aquaculture in countries affected by the 2004 tsunami; social issues in small-scale fisheries; combating illegal, unreported and unregulated (IUU) fishing; implementing the ecosystem approach to fisheries, including deep-sea fisheries; strengthening regional fishery management organizations (RFMOs) and their performances. The COFI also heard a presentation of the "State of World Fisheries and Aquaculture (SOFIA) 2006" before the meeting officially opened.

At the opening session, Mr David A Harcharik, FAO's Deputy Director-General, pointed out that the FAO's Fisheries Department had been renamed Fisheries and Aquaculture Department, in view of the growing importance of aquaculture.

Code of Conduct: Many members provided information on measures they had adopted to implement the Code. These included efforts to disseminate information about the Code, particularly among small-scale fishing communities, and progress in international plans of action (IPOAs). The Committee agreed that progress had been made in implementing the Code; but members needed to do more both individually and collectively.

Capacity and overcapacity in fisheries: The Committee reaffirmed linkages between overcapacity, allocations, overfishing and IUU fishing, and highlighted the need for both national and regional action. Some members said that while addressing the problem of overcapacity, the right of developing States to develop their own fisheries and participate in high-seas fisheries should be taken into account.

Many members described national initiatives to combat IUU fishing. Some members referred to monitoring, control and surveillance programs and vessel monitoring systems as basic tools to curb IUU fishing.

Regional Fishery Bodies: Recent conferences have urged FAO to strengthen its role on setting up a global capture fishery statistics database to provide information on fish stocks. In view of the primary role of regional fisheries management organizations and regional fishery bodies in data collection, it has been recommended that FAO should consolidate the catch data of RFBs into a single database under the general guidance of the CWP (Coordinating Working Party on Fishery Statistics).

Support on Code of Conduct: Many members thanked the FAO for the technical assistance it provided to support implementation of the CCRF and related instruments, especially on the management of inland and marine capture fisheries and the development of sustainable aquaculture. They asked that a greater share of the FAO's budget be allocated to fisheries and aquaculture to enhance capacity-building.

Reconstruction of livelihoods after the tsunami: Members commended the FAO for prompt and sustained support in tsunami rehabilitation, in areas such as damage and needs assessment, planning for sustainable rehabilitation, donor coordination, etc.

Many members said that massive and uncoordinated assistance triggered by the tsunami and the higher efficiency of new vessels had raised concerns about over-capacity. The Committee said this issue should be addressed, with FAO assistance as needed, through effective fisheries management arrangements.

Members were told that many boats provided through emergency assistance failed to meet minimum safety standards. FAO and other UN agencies should address the problem in collaboration with affected countries.

The Committee welcomed the emphasis in the tsunami rehabilitation programmes of some members in areas such as institution-building for fisheries management, habitat restoration, safety at sea, infrastructure rehabilitation, post-harvest activities and aquaculture development.

The Committee recommended that FAO should report more extensively on lessons learned from post-tsunami rehabilitation, and disseminate results widely. Some members stressed the need for better donor coordination, inclusion of local expertise, and greater emphasis on technical assistance in the face of severe natural disasters. Some members called for greater flexibility in procedures by the FAO to enable more rapid response to emergencies. Many members also urged further work on early warning systems for fishing communities. Members should strive to develop proper disaster management frameworks and supporting legislation.

COFI Sub-Committee on Fish Trade: The Committee noted the importance for developing countries of international trade in fish and fish products. Many members stressed the need for technical advice and assistance from FAO to improve market access for small-scale fisheries from developing countries. Some expressed concern about the increasing complexity of safety and quality requirements for fish and fish products, and the burden they imposed on developing countries. Many members noted the need for simple and practical traceability schemes for small-scale fisheries.

Ecolabelling: On the draft International Guidelines for the Ecolabelling of Fish and Fishery Products from Inland Capture Fisheries, the Committee recommended that FAO undertake further work on minimum requirements and criteria for ecolabels in inland capture fisheries.

Guidelines for Fish Trade: The Committee noted that an expert consultation had been held in Washington DC, USA, in January 2007, on technical guidelines for responsible fish trade. The Committee agreed that FAO should convene a technical consultation to consider these guidelines.

COFI Sub-Committee on Aquaculture: The Committee highlighted the importance of addressing socio-economic impacts of aquaculture, improving planning and policy development, ensuring food safety and human health, developing best management practices, developing risk assessment methodologies and guidelines for better management of aquaculture. The Committee asked FAO to implement the recommendations of the third session of the Sub-Committee on Aquaculture – particularly the need for technical assistance to members.

The Committee underscored the need for better information and data on aquaculture in support of sustainable development. The

Mr A Hettiarachchi, Chairman of the 27th session of COFI

Dr Faathin Hameed, Deputy Minister, Ministry of Fisheries, Agriculture & Marine Resources, Maldives at the COFI meeting.

Committee also recognised the role of certification and better management practices as part of an ecosystem approach to aquaculture; the FAO was requested to conduct expert workshops to develop guidelines on aquaculture certification. Thailand and Brazil confirmed their readiness to host such workshops in Bangkok and Brasilia.

Chile and Thailand confirmed offers to host the fourth and fifth sessions of the COFI Sub-Committee on Aquaculture in 2008 and 2010 respectively.

Social issues in small-scale fisheries: The Committee noted the precarious living and working conditions of small-scale fishers – which resulted from insecure rights to land and fishery resources, inadequate health and educational services and social safety nets, exclusion from wider development processes. The opportunities of small-scale producers, processors and marketers to benefit from globalization were often compromised by inadequate access to markets and deficiencies in financial services, know-how and capacity. Sustainable fisheries was a pre-requisite for sustainable livelihoods of fishers, it was pointed out.

The Committee stressed that policies and development programmes must be tailored to specific needs in particular locations, countries and regions and types of small-scale fisheries. Some members urged greater clarity in defining and classifying different categories of small-scale fisheries.

The Committee noted the positive experiences of several countries in mainstreaming small-scale fisheries into national development policies. It was desirable that lessons from these experiences should be shared through case-studies, south-to-south and fisher-to-fisher exchanges. The Committee stressed that human rights principles should be recognized and adopted to eradicate poverty and bring about responsible fisheries practices.

The Committee expressed support for the "strategy of action" noted in paragraph 23 of COFI/2007/6. It stressed the need for a rights-based approach to managing small-scale fisheries that respects the interests of present and future generations, ensures resource sustainability, and optimizes the flow of benefits to fishing communities.

Several members cited successful examples of capacity-building and empowerment in small-scale fisheries – such as literacy programmes, leadership training, and strengthening of fisher organisations. Differing views were expressed on the potential of small-scale fisheries to alleviate poverty.

Traditional forms of fishing rights and tenure, wherever these existed in the past, must be recognised, the meeting said. The poor must be protected from any adverse impacts resulting from the transition to rights-based fisheries management – by creating opportunities in areas outside harvesting, including aquaculture. Cross-sectoral policies were needed to integrate fisheries into coastal area management, and reduce the vulnerability of fishers and coastal communities to disasters.

The Committee considered different options to give greater prominence to small-scale fisheries in the FAO's Programme of Work. The Committee noted the strong support from many members for a COFI Sub-Committee devoted to small-scale fisheries.

The Committee welcomed Norway's proposal for a broad-based international conference focusing on small-scale fisheries.

Combating illegal, unreported and unregulated (IUU) fishing: The Committee thanked the FAO for capacity-building activities to enhance implementation of International Plans of Action to combat IUU fishing. Many members described their fight against IUU fishing as one of high national priority because of its economic, biological and social consequences.

The Committee noted the strong support for a Norwegian proposal to develop a new legally binding instrument concerning port state measures to combat IUU fishing. An expert consultation is to be convened in the latter half of 2007 to prepare a draft agreement and a technical consultation on the text of the instrument.

Ecosystem approach to fisheries including deep-sea fisheries, marine debris and lost and abandoned gear: Members reported on the progress they were making to implement an ecosystem approach to fisheries (EAF). They commended the FAO's efforts to raise awareness in this context, and urged the FAO to complete and distribute quickly technical guidelines on the social, institutional and economic considerations in EAF. Many developing countries requested greater FAO support for capacity-building and technical assistance on implementation of EAF.

Several members raised the issue of the threats posed by climate change. A proposal was mooted for an FAO study to identify key issues in climate change and fisheries and discuss how the fishing industry can adapt to climate change. It was suggested that FAO should take the lead in informing fishers and policy-makers about the likely consequences for fisheries of climate change.

COFI agreed that FAO should convene an expert consultation, no later than August 2007, to prepare draft technical guidelines for management of deep-sea fisheries in the high seas. It was agreed that the guidelines should include standards for identifying vulnerable marine ecosystems beyond areas under national jurisdiction and the impacts of fishing activities on such ecosystems. Some members called for a moratorium on high seas fisheries until the impacts of fishing activities on these ecosystems could be assessed.

The meeting reaffirmed the important role of marine protected areas (MPAs) in biodiversity conservation and fisheries management. The FAO was encouraged to complete early its technical guidelines on design, implementation and testing of MPAs.

Small - scale fishers - Bangladesh

COFI agreed that FAO should continue its work on biodiversity mapping as an important contribution to the implementation of EAF.

Many members expressed concern on the safety at sea of fishing vessels, particularly small vessels. FAO was urged to continue collaboration with IMO. It was suggested that FAO should develop guidelines on best practices for safety at sea. COFI should consider developing an IPOA (International Plan of Action) on the subject.

Strengthening regional fisheries management organizations (RFMOs): Japan informed the Committee about a joint meeting of five RFMOs for management of tuna stocks, held in Kobe, Japan, in January 2007. Many members supported the idea of joint meetings of non-tuna RFMOs with a mandate and objectives similar to those of the tuna RFMOs. FAO was asked to provide assistance and advice for the process.

Many members requested FAO to continue supporting RFMOs and RFBs (regional fishery bodies) on issues of concern to them such as overcapacity, improvement of fleet statistics, and issues that undermine the effectiveness of RFMOs.

FAO's Programme of Work in Fisheries and Aquaculture: The Committee expressed dissatisfaction with the level of the budget assigned to the Fisheries and Aquaculture Department, which was not commensurate with the importance of its work and the expectations of the international community. The Committee urged relevant FAO Governing Bodies to allocate more resources to the department. Many members stressed that major activities of the department should be funded by the regular FAO programme. They expressed concern at the increasing proportion of extra-budgetary funding for support to these activities. They requested a more detailed report on such funding, in the interest of greater transparency and accountability.

Other matters: Some members noted the active role of NGOs in promoting responsible and sustainable fisheries and aquaculture round the world. They stressed the need to develop, within the framework of COFI, a fair and equitable process to promote dialogue between members and NGOs.

It was agreed that the 28th session of the Committee would meet in Rome in the first quarter of 2009.

Secretariats of Regional Fishery Bodies Meet in Rome

Some 40 regional fishery bodies (RFB) exist on this planet. They are diverse in size, age, and scope. Some are a part of the FAO (such as the the Indian Ocean Tuna Commission or IOTC), some are not. Some are global, some regional. The BOBP-IGO, for example, is an RFB in the Bay of Bengal region. Each body has its own development mandate, its own acronym, its own headquarters and secretariat, its own funding mechanism.

The secretariats of the RFBs have set up a network. The First Meeting of the Regional Fishery Body Secretariats Network (RSN-1) was held at the FAO headquarters in Rome on 12-13 March 2007, soon after the meeting of COFI (Committee on Fisheries) – reported on pages 5-8 of this issue of BBN. Twenty seven secretariats, including that of the BOBP-IGO, took part, aong with representatives of the FAO and office-bearers of some other organizations.

Here are some highlights of what was discussed and decided at RSN-1.

— Mr Ichiro Nomura (Assistant Director-General, FAO Fisheries and Aquaculture Department) opened the meeting. He said the FAO would continue to support the RSN. He said that illegal, unreported and unregulated (IUU) fishing was one of the greatest threats to sustainable and responsible fisheries. Effective fisheries governance, regional and global, was essential to tackle the problem.

— The Secretary of COFI, Dr Ndiaga Gueye, said that COFI-27 had acknowledged the strong input of regional cooperation in facilitating the implementation of the FAO Code of Conduct for Responsible Fisheries and related instruments. He pointed out that COFI had urged that RFMOs (regional fisheries management organizations) should be strengthened, and best practices developed for them.

The Chairman, Prof Denzil Miller, highlighted several issues from the COFI-27 Draft Report as being important for RFBs. These included

- Implementation of the Ecosystem Approach to Fisheries (EAF) and the problem of fisheries bycatch;
- The suggestion that with the increasing number of organisations engaged in international fisheries, the FAO should assert its leadership as the universally representative fisheries institution. Strong and ongoing cooperation between the RSN and FAO is globally important.
- Continued discussion and work on harmonization of catch documentation.
- A Norwegian proposal for an international conference on small-scale fisheries.
- Measures to combat IUU fishing.
- Threats posed by climate change to the EAF, along with development of technical guidelines to include standards for management of deep-sea fisheries on the high seas.
- Strengthening RFMO performances, particularly the outcomes of the 2007 Tuna RFMOs Meeting.
- The request of many COFI Members for FAO to continue supporting RFMOs and RFBs on such issues as overcapacity and improvement of fleet statistics.

Small Scale and Inland Fisheries

— RSN-1 noted that small-scale fisheries received significant attention in COFI, and that this trend is likely to continue in

future. It was acknowledged that small-scale fisheries increasingly interacts with large-scale fisheries.

Mr Nomura acknowledged that COFI has not been very clear in its approach to small-scale fisheries. He asked for RSN's advice on how the theme of small-scale and inland fisheries should be addressed at future COFI meetings. He also invited RSN inputs on agenda items for the next meeting of the Advisory Committee on Fisheries Research, to be held prior to the next COFI meeting.

— RSN-1 agreed that the profile of small-scale and inland fisheries should be raised so as to attract sufficient resources. It was strongly suggested that a document outlining some of the key issues should be developed well in advance of COFI-28 to allow endorsement by the RFBs concerned.

— It was noted that the RSN can provide a useful contribution on priority actions for small-scale and inland fisheries to be communicated to FAO and other sector stakeholders. It can also provide guidance and advice should an extra-budgetary FAO programme for small-scale fisheries be developed.

— RSN-1 agreed that a Norwegian proposal for a global meeting on small-scale fisheries would offer a unique opportunity for inputs from RSN members.

— The meeting discussed external factors affecting fisheries management. These included governance and overcapacity concerns in small-scale and inland fisheries, effects of climate change and impacts from land-based pollution.

— Disaster preparedness by small-scale fishing communities and the need to improve inter-agency cooperation with other international organisations dealing with fisheries issues, such as CITES and WTO, were also discussed.

Concern was expressed about lack of information on combating IUU fishing. The information systems needed were lacking too, especially in developing countries. A lack of human and financial capacity to deal with unregistered vessels was a cause for concern. Additionally, it was noted that IUU fishers often engage in criminal activities unrelated to fishing.

Coping with overcapacity

— RSN-1 discussed overcapacity and difficulties in dealing with it, such as lack of essential data, unreliable statistics, lack of political will, and valuation of resources. It was noted that one approach that has met with some success is the development of alternative livelihoods. It was suggested that information in this context should be shared. A precautionary approach to overcapacity (*i.e.* limiting fishing capacity wherever this was possible and avoiding wanton deployment of excess capacity) was suggested by some members.

— Mr Kevern Cochrane, Senior Fishery Resources Officer, FAO, presented an update on information requirements concerning the ecosystem and fisheries management by RFBs. During discussions, it was pointed out that developing countries needed more support to improve their ability to implement EAF. The need to address threats posed by climate change and its potential effects on fisheries was also stressed. RSN-1 acknowledged that the calamitous predictions often made about the potential effects of climate change made the jobs of fisheries managers harder and more complex.

RSN-1 recognised that different approaches to the EAF will be taken in different types of fisheries, such as small-scale and industrial fisheries as well as marine and inland fisheries. RSN-1 agreed that education and information exchange are key elements for an effective EAF.

RSN-1 noted that considerable resources may often be required for RFBs to fully engage in the EAF, since a wide range of expertise (including scientific, legal and socio-economic) was necessary to fully address all EAF requirements. But a gradual expansion of more traditional fisheries management approaches would also be helpful; this had already been implemented by a number of RFBs and national fisheries management organisations.

— RSN-1 discussed the possible role of an RSN website in facilitating and coordinating information exchange. This could assist the Network to avoid duplication of its activities, promote the RSN's visibility and provide information on meetings. But a strong website that was systematically vetted and updated would require resources. It was agreed to circulate a concept note for further consideration, with an option for FAO to host the site.

— The next meeting of RSN may be held in 2009, immediately following COFI-28, with an informal meeting of participants being scheduled for noon on the first day of COFI.

Small Vessel Safety and Sustainable Coastal Development

Jim Sandkvist, Vice President, SSPA Sweden AB, Gothenburg, Sweden

Making fishing vessels safer is one of the most fundamental measures to improve sea safety. But most international legislation to ensure sea safety relates to vessels larger than 24 meter (m). Vessels under 12 m are not covered by any international legislation – and are very often outside the pale of national regulations as well.

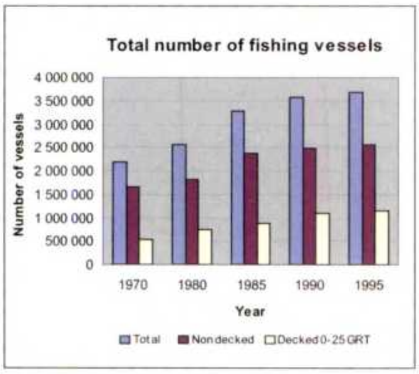
Safety at sea is frequently discussed at SIDA-funded training programs dealing with "Sustainable Coastal Development and Maritime Safety Management," conducted every year. This paper is an experience-based rather than a technical discussion of safety at sea for small fishing vessels. It applies SSPA's experiences from 15 years of engagement in international multidisciplinary coastal zone development programmes in different parts of the world.

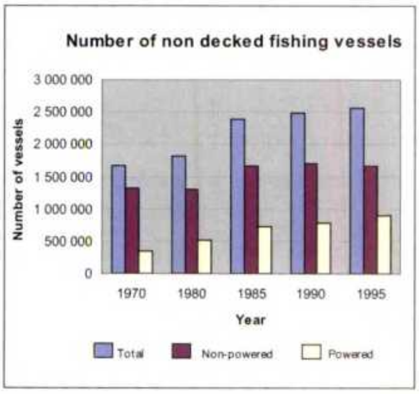
The paper discusses both a top-down and a bottom-up approach to improved safety of small fishing vessels – which would encourage and ensure sustainable coastal development. The paper provides impressions, lessons and recommendations concerning the design and operation of fishing vessels, institutional requirements for sea safety, search-and-rescue procedures, safety training, and safety standards and regulations.

Fishing fleet

The world's fishing fleet has almost doubled over the last 25 years. In 1995, the fleet consisted of about 3.6 million vessels. Two-thirds of the vessels were undecked; vessels generally less than 12m in length. (*FAO Fisheries Circulation No. 966* and *Bulletin of fishery statistics 35, Fishery fleet statistics, FAO, 1998.*)

The fishing fleet often consists of small boats and canoes. These are central to the family and the local economy in coastal municipalities and communities. But small vessels (under 12m in length) used for fishing and transportation figure prominently in accident statistics – worldwide but particularly in developing countries.





Jim Sandkvist

A multi-disciplinary approach

Improving fishermen's safety at sea requires a multidisciplinary approach and the efforts of stakeholders at various levels. National and international regulations must be followed, local awareness must be raised, financial support provided to fishermen and boat owners, fish handling quality must be improved.

Regulations and guidelines for small vessels

Maritime authorities are normally responsible for registering large vessels, but very often, small vessels (smaller than 12 or 24 meters) come under the domain of fisheries. It is suggested that national regulations and guidelines should be established for design, construction and equipment of small vessels. A system for inspections to follow up the regulations should also be established. The regulations should be adapted to local conditions and

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This article is based on a presentation made by Jim Sandkvist at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, Chennai, 1-4 February 2006.

should be practical, so that they can be implemented.

A vessel classification system should be in place. It should include different categories of vessels, operational standards and categories. It should specify design criteria by size, loading capacity, the maximum or minimum number of persons that can board the vessel. It should state whether the vessel can be fitted with an engine. If yes, what should be the maximum power of the engine. There should be guidelines for emergency and safety equipment, such as fire fighters, life jackets, life rafts, radio, compass, sea charts, etc.

Fisheries Authorities

The fisheries authority is responsible for sustainable development of the fishing industry and for protecting the marine resource. Catches are regulated through different quota systems such as "total allowable catch" and different types of individual quotas. Different zoning systems could be introduced to separate artisanal fishing from industrialised trawling. (See *Risk and dangers in small–scale fisheries, ILO 2000; The state of world fisheries and aquaculture, FAO; Safety at sea as an integral part of fisheries management; FAO Fisheries Circular No 966 (2001)*.

Coast Guard and/ or Navy

The Coast Guard and the Navy are other maritime authorities responsible for safety at sea. In several countries, they take primary responsibility for search and rescue (SAR) work when vessels or fishermen are missing at sea. The work is often undertaken in co-operation with voluntary SAR organisations.

Rescue services organisations or fire brigades

Rescue services organisations or fire brigades go into action for near-shore rescue work, while the Coast Guard and the Navy take care of rescue operations further offshore.

NGOs and volunteers

In developed countries, where search and rescue are well organised, NGOs have an important role to play. NGOs and local voluntary organisations should be encouraged in developing countries as well. Since they know local conditions well, they are capable of rapid response.

Port authorities

Most small vessels land their catches on the beach or in harbours or ports. The port authorities are responsible for monitoring and control of the landed catch. Port authorities could also measure catches if a quota system is introduced.

Meteorological services

Weather-related accidents are common everywhere, as FAO statistics bear out. Reliable weather forecasts are therefore crucial for safety at sea, and early warning systems are necessary, particularly in places vulnerable to cyclones and hurricanes. These are organized in some countries by meteorological institutes.

Boatbuilders and designers

A fishing boat often retains a certain buoyancy even if flooded with water, even if it turns turtle after an accident. It then serves as a floating device for its occupants. Local designers and boatbuilders must be trained in incorporating such safety features. Their choice of boat design, construction materials and fish handling methods is usually based on tradition, and on access to cheap and renewable materials. The co-operation of boatbuilders and designers is essential to make boats better and safer, and to introduce new regulations.

Families

The wives and children of seamen and fishermen ought to be as aware of occupational safety as the men themselves. The family plays a vital role in reducing accidents. Families' concerns for the safety of fishermen, and their strong stake in such safety, are factors that should be utilized to lower accidents and accident risks at sea.

The local community and the local economy depend on the family. So do co-operatives, local NGOs and small firms.

Safety training should be imparted early in school, particularly in coastal areas. The long-term effects would be invaluable.

The boat owner and the crew

The boat owner should be responsible for the safety of his crew, and for the vessel being in good condition. It should be registered with the relevant national authority for use as a fishing or transportation boat. It should fulfil criteria for stability and loading capacity.

Traditional out-rigger construction, Tanzania.

The boat owner or captain is expected to:

- ensure that the vessel is in good condition and registered according to the rules.
- be responsible for the vessel being manned only with well trained and skilled crew;
- be responsible for the safety equipment on board the vessel being in good working condition.
- be responsible for the navigation equipment being in sound working order;
- be responsible for the fishing gear or other gear onboard the boat;
- ensure that the vessel is not overloaded with fish catch, goods, or passengers;
- ensure that the vessel does not go out in bad weather or when storms or cyclones are forecast.

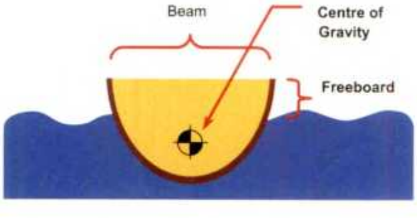
A frequent cause of accidents is that the crew lack training.

All crew members should know to swim. They should be well-trained in vessel handling and gear-handling in good or bad weather, also in handling safety equipment in bad weather. The crew should be well-versed in vessel stability, should know where to place catch, goods, or passengers for the best stability. The crew must be aware of the vessel's loading capacity and act accordingly, in relation to fish catch, goods, and passengers.

The crew must keep abreast of weather forecasts. It should stay ashore if weather conditions worsen.

The safety of fishing vessels depends to a large extent on their technical standards and on how they are operated. Safe design supports safe handling. Choice of construction material and good maintenance are vital.

A system of boat classification in accordance with their stability and seaworthiness is essential. However, in many countries, there is no register or classifying system for small vessels.



Stability

The stability of a boat is its ability to withstand heeling and to resist capsizing.

Important parameters in this context:

- Vertical centre of gravity
- Beam
- Freeboard
- Free surface area

To ensure sound stability, the boat should have a low vertical centre of gravity. This will happen if the entire load is stowed low in the boat. The load includes fishing equipment, food, tanks, catch, etc.

A larger beam, and to a certain extent a larger freeboard, helps ensure stability. Large free surfaces endanger stability. "Free surfaces" include half-loaded tanks, bilge water and loosely stowed catch. It is very important to keep the free surfaces to a minimum.

Capability to stay afloat is another important property. This is achieved by two factors – good stability, and watertight compartments or other devices for buoyancy.

The stability can be tested in safe areas (preferably near the shore) and with the boat dry and without load. While in this condition, the boat shall fulfill the following:

- With all crew members sitting on the same gunwale, the boat shall withstand capsizing.
- In this condition, the boat shall also have enough freeboard so that no water enters the boat from the side.

A boat that does not meet these two criteria should be modified to meet them. Outriggers would considerably increase stability.

One criterion for buoyancy is that the boat should not sink with all crew members standing in the boat when completely swamped. Wood is a good construction material for buoyancy. The rib collars would make the boat unsinkable besides improving its stability. A watertight compartment can be built in. A floating element such as foam plastic can be arranged inside the hull. The floating elements could be combined with a fixed ice box in a fishing vessel.

Free surfaces should be avoided – by keeping bilge water away, dividing large tanks into smaller

tanks, dividing the catch into smaller portions, etc.

Construction

Small locally manufactured boats have their own traditional hull forms based on local fishing techniques, sea conditions and construction materials.

Owners and users of small traditional fishing boats like *bankas* and dugout canoes should be aware of their advantages as well as disadvantages.

- Small boats are open and therefore not quite convenient for sleeping or cooking facilities.
- The crew are exposed to sun and rain.
- Not adaptable to use of large and heavy fishing gear.
- Usually not adaptable to most kinds of mechanically operated fishing equipment.
- Not very durable.
- Weather-sensitive.
- Being open, they must usually return to base daily.
- Fish-holding capacity is limited.

The use of smaller fishing vessels also means the following:

- Low cost.
- No harbour or special installations are required, they can be hauled up the beaches along the coast.
- The fisherman can live in the proximity of the coast adjacent to berthing areas and therefore remains in rural surroundings, instead of migrating to towns and causing housing and other social problems.

- Dispersal of small boats along the coast enables widespread fish supplies, often without the additional cost of road transport increasing the cost of distribution.
- No slipways needed for servicing. Therefore inexpensive to maintain. Dugout canoes require no caulking.
- Local skills and local materials are used in their construction, thus providing local employment.

Traditional wooden boat built on the beach in Tanzania.

- Small boats are traditionally so constructed that they remain afloat if they capsize. The fisherman regards his small boat as his "life raft".
- Small boats are able to operate in very shallow areas.
- Often indispensable in places inundated by floods.
- Can be propelled by oar in the event of engine failure.
- These boats can be constructed on the beach. No centralized boatyard or expensive equipment needed.
- Are adaptable to various types of fishing gear, *e.g.* hook and line, longline, multiple-trolling rig, gillnet, cast net, beach seine, fish traps, small shrimp trawl.
- When not in operation, they require no hurricane shelter in areas which are subject to such phenomena. In such an emergency they can be weighted with sand or hauled into safe areas.
- Since they are taken out of the water daily, damage through marine borers is avoided.
- Fishermen can be in daily contact with family and friends.
- Improvements to such craft should focus on actions that can improve stability and floatability.

Most traditional boats have evolved and refined over a long period. Today some of them get fitted with large engines – though they were

not designed for such engines – and go further offshore. Sometimes new materials are introduced to "modernize" the vessels without changing the vessel's design and construction.

The boat should be made unsinkable, through wooden construction or through watertight chambers in plastic and metal boats. If the boat capsizes, it acts as a life buoy. Most traditional boats are made of wood and will float after an accident. However, new boats based on traditional models but without watertight chambers will not float, and cannot act as life buoys.

The introduction of modern construction materials such as fiberglass, plastic and even plywood, provides opportunities to increase the boat size, change design and bring in new substitutes for traditional materials. However, if not used in a safe manner, these new materials may lead to severe consequences. Fiberglass and plastics considerably change the buoyancy of a water-filled boat. The boat may sink. On the other hand, proper use of fiberglass will modernize the design and improve safety.

The use of modern construction materials and their implications for safety, further strengthen the need for training, safety awareness and control.

An integrated approach to safety at sea.

To improve safety at sea, an integrated approach is required. Regulations and inspections should focus on awareness, support and safety improvement measures, to be implemented in close cooperation with local authorities and stakeholders.

Small fishing vessels do not usually generate enough income for investments in safety measures such as life vests or GPS. The income is sufficient only for every-day sustenance.

The local fisherman needs ownership and control of his boat. Very often, he rents the boat from a local owner, and boat safety depends on the owner. The fact that rents have to be paid regularly sometimes makes fishermen go out even in bad weather.

Micro-financing mechanisms should be considered to support fishermen or groups of fishermen in investments in safer boats. Such investments call for exposure to larger markets with better income opportunites. The development of the local fishery industry is a vital part of coastal zone development in many developing countries.

Insurance schemes need to be introduced for poor communities engaged in small-scale fisheries. The FAO has discussed the possibility of community-based insurance schemes for fisher groups in Africa. The outcome of this initiative is not known.

The system in some West African countries is that fishermen form interest groups. Every fisherman contributes a small monthly fee to a mutual aid fund. In the event of an accident, whatever be the need – assistance for widows, a funeral, vessel replacement, hospital care for an injured fisherman — money is made available from the mutual fund.

Recommendations

The safety of small fishing vessels is a subject that has aroused great interest in various international fora. Recommendations for future work have been made in the Chennai Declaration of 2001 and the SEAFDEC recommendations of 2003. The latter are listed below:

- Leave the definition of small fishing boats and operational range up to individual countries.
- Promote the registration of small fishing boats.
- Promote coordination among concerned authorities on monitoring and control of small fishing boat safety as well as socio-economic considerations.
- Strengthen local authorities and promote policies of safety at sea within coastal communities.
- Promote technical and financial support from authorities, including subsidies, at all levels for issues of safety at sea.
- Identify and promote basic requirements for safety at sea in the areas of :
  - Research on design and construction of small fishing boats including modification of traditional type boats,
  - Safety equipment including fire-fighting and life-saving appliances, and
  - Regular boat inspection systems.
- Implement training and education programs for all stakeholders including fishers and boatbuilders for the basic requirements of:
  - Boat design and construction,
  - Equipment and its correct use,
  - Search and rescue,
  - Occupational health and safety awareness, including the avoidance of dangerous fishing practices, and
  - Awareness of environmental factors.
- Develop and promote the use of appropriate communication systems for:
  - Weather forecasting information
  - Search and rescue systems
- Develop appropriate incident-reporting and investigation systems to improve safety at sea.

BOBP-IGO's Technical Advisory Committee Meets in Chennai

The second meeting of the Technical Advisory Committee (TAC) of the BOBP-IGO, held in Chennai on February 5 and 6, 2007, reviewed past work and the future directions of the IGO. Representatives of Bangladesh, India, Maldives and Sri Lanka took part. Welcoming delegates, Dr Y S Yadava, Director of the BOBP-IGO, briefly discussed work during the year.

In his inaugural speech, Mr Ajay Bhattacharya, Joint Secretary (Fisheries), Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, said several activities had been carried out by the BOBP-IGO, most of which were relevant and useful for member - countries. He urged that synergies between countries should be built up to the fullest extent.

Dr Md Shiham Adam (Maldives), outgoing chairperson, thanked the Secretariat for its ooperation and support during his tenure as the TAC chair. Mr Ajay Bhattacharya was unanimously elected chairperson.

Report on BOBP-IGO activities

The Director of the BOBP-IGO presented a report on activities carried out by the Secretariat during the reporting period October 2005 to December 2006. He said the Bay of Bengal (BoB) region supported the livelihoods of some 50 million people directly and indirectly. But the capture fishery was declining, and might affect livelihoods, food availability and national economies in the member-countries.

However, the BoB can produce significantly more fish than present landings through improved resource management brought about by scientific technological inputs, better all-round awareness, greater community participation in resource management and co-management.

The BOBP-IGO implemented the following activities during the period:

– A National Workshop on the Code of Conduct for Responsible Fisheries was organised during 9-10 December 2005 in Colombo in co-operation with the authorities in Sri Lanka.

– A detailed assessment of the safety of small fishing vessels in India, Maldives, Sri Lanka and Thailand, the first of its kind, was carried out during October 2005 with the assistance of a consultant from Iceland.

– The IGO took part in a "scoping study" on Tsunami Rehabilitation: Assessment of Policy Support for Sustainable Pro-Poor Fisheries in Tamil Nadu, India. It was commissioned by the UNDP and carried out in association with the World Bank, the DFID and the FAO.

– The Third International Fishing Industry Safety and Health Conference (IFISH-3) was organised in Mahabalipuram, Tamil Nadu, India from 1 to 4 February, 2006, in collaboration with the FAO and the Alaska Centre of NIOSH, United States. A thematic workshop on Post-tsunami Revival of Fisheries Sector and Rehabilitation of Fishing Communities was also organised at the same venue on 6 and 7 February 2006.

– The BOBP-IGO is publishing newsletters and translating FAO Technical Guidelines and International Plans of Action on marine fisheries into local languages. It has also brought out posters and calendars.

– The formidable task of digitizing a select photo collection of over 50 000 photographs is 80 percent complete. The digitized archive will constitute a rare and valuable

Second Meeting of the
Technical Advisory Committee
5 - 6 February 2007
Chennai, India

resource on small-scale and artisanal fisheries in the Bay of Bengal region.

– New activities: The IGO will partner the FAO in implementing the South Asian activities of a global FAO Project on 'Safety at Sea for Small-Scale Fisheries in Developing Countries'. The 2-year project will start in May 2007 and will be implemented in all member-countries. The IGO will also be a partner in a FAO-IMO project on Small Fishing Vessel Safety in Sri Lanka and India in the wake of tsunami reconstruction and rehabilitation effort.

– Technical assistance was provided to the International Cooperative Fisheries Organisation of the International Cooperative Alliance in conducting a workshop for Fisheries Cooperatives in Sri Lanka; and to a Training Project on 'Promotion of Community-based Fishery Resource Management by Coastal Small-scale Fishers in the Philippines'

– A study was carried out on 'Development of Marine Fisheries and Post-harvest Sectors in Orissa' in collaboration with the UNDP.

Commenting on the presentation, Dr Adam said that Maldives had witnessed a constant increase in tuna production; the new-generation fishing fleet introduced in the country might further increase it. Maldives is trying to introduce aquaculture of species such as groupers; if technical support and expertise were made available, this could give a fillip to aquaculture production.

In response to a query from Mr Parikshit Datta Chowdhury of Bangladesh, the Director, BOBP-IGO said that while funds were sufficient for the IGO's core functions, its Secretariat was small and could benefit from staff secondments provided by member-countries. Such a practice would give the staff concerned wide exposure and experience and would therefore help the countries concerned as well.

– Dr V S Somvanshi of India complimented the BOBP-IGO on its excellent work. He referred in particular to popularization of the Code of Conduct in the region, technical support for post-tsunami rehabilitation, and digitization of the IGO's photo collection.

– Dr Adam expressed happiness with the IGO's work programmes. Its review of sea safety issues in the Maldives was the first of its kind. It would lead to guidelines for safety and construction of better fishing vessels.

– Responding to a query from Dr Adam, the Director, BOBP-IGO said that a web portal for fisheries scientists and institutions in the BoB region, already undertaken, was making progress. So far, information on some 80 fisheries scientists/ institutions had been placed in the portal.

– Mr Abeywickrama of Sri Lanka thanked the IGO for its support. He cited in particular the technical support provided for the development of fisheries cooperative societies in Sri Lanka. Mr J W Rathnayake (Sri Lanka) mentioned the IGO's support for post-tsunami rehabilitation. More support was needed for sustainable development of marine fisheries.

– Mr Rathnayake and Mr B S Yadav (India) discussed the issue of capacity enhancement of the Sri Lankan Coast Guard with support from the Indian Coast Guard (ICG). Mr Yadav said that some initial meetings had taken place on this issue. Mr Ajay Bhattacharya, chairperson of the meeting, said the Indo-Sri Lankan Joint Working Group was working on the issue. It was also discussed with the Fisheries Minister of Sri Lanka who visited India recently.

– Mr Bhattacharya expressed appreciation of the Scoping Study prepared by the BOBP-IGO in association with UNDP, DFID and the World Bank. He said the Government of India proposed to take up a similar study in three more coastal states.

Proposals from Member-Countries:

Discussing the status of marine fisheries in Bangladesh, some major constraints to sustainable development, and some of its national priorities, Dr Rahman said that the BOBP-IGO could take part in HRD for marine resource assessment, development of mariculture technology and marketing and exchange of technical know-how among member- countries. A joint management plan for hilsa should be considered on a priority basis between India and Bangladesh, and possibly Myanmar as well.

Discussing marine fisheries resources availability, production and management in India and current problems, Dr Somvanshi said the recently published National Marine Fisheries Census 2005 revealed that some three million people depended on marine fisheries for their livelihood – a much higher figure than what was earlier believed. About under-exploited resources, he said only some 30-35 000 metric tonnes of tuna was being harvested, against a potential of about 2 46 000 metric tonnes. The TAC noted that the marine fisheries sector in India needs more management inputs and also sound strategies for harvesting species like tuna that are grossly under-exploited.

Fisheries in the Maldives cannot be discussed without discussing tuna fisheries, Dr Adam said. In recent years, the tuna fishery has been inhibited by the growth of bait. Also important is the coastal fishery, which includes resources such as scads, jacks, breams, emperors, wahoo, sharks, groupers, marlins, bait fishes and the aquarium fishes. The government's priorities include socio-economic betterment of fishing communities, diversification and post-harvest improvement, pearl culture, manpower development and sustainable fishing practices.

On the scope of BOBP-IGO's work, Dr Adam noted BOBP's strength in documentation and manpower building. Issues like community-based fisheries management, in which BOBP had taken part earlier, needed new inputs. Studies on the socio-economics of reef fishing communities and on innovative methods of catching bait fish could also be considered. Dr Adam emphasized the need for a regional management plan for shark fisheries. The BOBP-IGO could play an important role in developing a management plan for shark fisheries covering India, Sri Lanka and the Maldives.

Mr Abeywickrema said the tsunami had inflicted damage estimated at US $ 900 million on physical assets in Sri Lanka. More than 75 percent of the fishing fleet had been either destroyed or damaged. The Government was striving for speedy recovery. He expressed concern at the quality and seaworthiness of new fishing vessels provided to fishers who had lost their boats to the tsunami.

On other priorities for fisheries development, Mr Abeywickrema described efforts to set up a state-of-the-art fish market complex, improve the deep-sea fishing capacity of fishers, better the infrastructure and revive the shrimp sector. Licensing of fishing vessels and awareness-creation programs had been undertaken.

Secretariat: Work Plan

The Director, BOBP-IGO presented the work plan for 2007. He said the IGO would continue translating CCRF documents into local languages. He sought the co-operation of member-countries in organising a fisherfolk week during the current year. The Secretariat proposed two new programmes for implementation in 2007: on monitoring, control and surveillance (MCS), and on management of hilsa and sharks.

Proposal on Monitoring, Control and Surveillance

Presenting a proposal on MCS, the Director, BOBP-IGO said that an effective and implementable legal framework was essential for resource management and conservation. But lack of data, manpower, and awareness were major constraints to an effective MCS regime. The proposed programme would bridge this gap through HRD activities, strengthening the legal framework, mobilizing expertise and motivating stakeholders.

Mr B S Yadav described the work of India's Coast Guard (ICG) in implementing MCS in fisheries. Sri Lanka requested training assistance for their Coast Guards by the ICG.

The Maldivian delegation said that a draft Fisheries Master Plan to be submitted to the President included plans to implement an MCS. Only longlining was permitted for foreign fishing vessels in the EEZ, and registration of fishing vessels was not mandatory. But logbooks had been introduced for fishers. Maldives has an enabling legal system to support full introduction of MCS, but regional and international collaboration are necessary for the success of the MCS programme.

The Bangladesh delegation said the main problem it faces in implementing MCS is lack of manpower to enforce existing laws like registration of trawlers and motor boats. Catch size monitoring is also difficult for the same reason. Piracy and robbery are other important MCS issues. Bangladesh needs the BOBP-IGO's support for hands-on training and technical support in satellite monitoring of stocks.

The TAC agreed to convene a regional Workshop on MCS in June/ July 2007 in Bangladesh, subject to the concurrence of the Government of Bangladesh. It suggested that BOBP-IGO Secretariat seek technical support for organising the Regional Workshop from FAO or other agencies such as the MCS Network.

Proposal on management of Hilsa and Sharks

The Secretariat presented a detailed overview of the proposed programme on management of Hilsa fisheries in India and Bangladesh and management of shark fisheries in Maldives, Sri Lanka and India. Dr Rahman proposed that Myanmar be also be included in the Hilsa management plan. He said that Bangladesh has established some management plans for Hilsa but a lot more needs to be done, especially in cooperation with neighboring countries such as India and the Myanmar. He suggested a joint management policy, especially with regard to the juvenile fishery.

The TAC agreed that the following agencies could help prepare a management plan on Hilsa fisheries: Bangladesh Fisheries Research Institute; Ministry of Fisheries and Livestock, Bangladesh; Central Inland Fisheries Research Institute, India; and the Fishery Survey of India. An appropriate co-operating agency from Myanmar would also be identified. The first meeting will be held in July/ August 2007 in India subject to government concurrence.

Mr Md Shainee of the Maldives expressed appreciation of the idea of a regional action plan on sharks. The TAC identified the following institutions for the activity — Fishery Survey of India; Central Marine Fisheries Research Institute, India; Marine Research Centre, Maldives; Ministry of Fisheries, Agriculture and Marine Resources, Maldives; National Aquatic Resources Research and Management Agency, Sri Lanka; Ministry of Fisheries and Aquatic Resources, Sri Lanka. The TAC agreed to convene the first meeting in September 2007 in Sri Lanka subject to government concurrence.

Third TAC meeting: The Committee agreed to convene the third meeting of the TAC during late 2007 in Sri Lanka, subject to government concurrence.

Sea Safety Programmes in Bangladesh

Md. Giasuddin Khan, *Deputy Director, Department of Fisheries, Bangladesh*

Bangladesh has a coastline of 714 km and an Exclusive Economic Zone (EEZ) of 164 000 km^2 of which the continental shelf takes up 44 percent. The country has a vast river network and a dynamic estuarine ecosystem. A drainage basin — covering also parts of India, Nepal, Bhutan and China, with waters draining into the Bay of Bengal – intersects the coastal zone of Bangladesh. The coastal zone includes coastal plains, islands, tidal flats, estuaries, and neritic and offshore waters. It houses several natural mangrove forest ecosystems, including the Sundarbans that supports a rich aquatic biodiversity.

The total fish production in Bangladesh is 2.10 million mt, of which marine fisheries accounts for around 21.66 percent. The fisheries sector contributes 5.71percent of the total export earnings and 4.92 percent of the GDP, and employs 1.2 million people (full time) and 12 million people part-time. Total fish production has been increasing over the decade, mainly because of aquaculture. 92.7 percent of marine catches are landed by artisanal fishers who employ smaller and less efficient fishing boats and gear to catch post-larvae and juveniles.

Unplanned and uncontrolled expansion of fishing activities, particularly in the inshore artisanal sector, have reduced the potential of marine fishery resources. On the other hand, a number of fish species remain unexploited or under-exploited. But for Hilsa (*Ilisha tenualosa*), pelagic fishery resources have remained untapped. The government recently sanctioned 50 offshore boats to diversify resource exploitation.

Because of rough weather conditions in the bay over three quarters of the year, safety at sea is an important issue. Deaths of fishers and loss of boats and gear are common. A number of rules relating to fisher safety and seaworthiness of fishing vessels are being implemented by the Mercantile Marine Department (MMD). The 'Bangladesh Fishing Vessel Equipment Rules, 2005' are a part of the Bangladesh Merchant Shipping Ordinance, 1983 (Ministry of Shipping).

The Department of Fisheries (DoF), which manages marine fisheries resources, issues licenses only to fishing boats that have obtained registration certificates from the MMD. The Marine Fisheries Ordinance, 1983 and subsequent rules address issues like fishing effort control, mesh size control, closed seasons, marine parks and sanctuaries, zoning of fishing areas

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This paper was prepared for the Third International Conference on Fishing Industry Safety and Health (IFISH-3), held in Mahabalipuram from 1 to 4 February, 2006.

…, but not matters relating to safety of fishers at sea.

Coastal fishing operations & outputs

Different fisheries have different target species. The trawl fishery, and in particular the shrimp trawlers, target penaeid shrimps. The ESBN (estuarine set bag net) fishery, which is the predominant fishing method used by artisanal/ coastal fishers, largely targets juvenile fish. The key commercial marine shrimp species are *Penaeus monodon* (tiger shrimp), *Penaeus indicus* (white shrimp), and *Metapenaeus monoceros* (brown shrimp). The major commercial landing of finfish species comes from hilsa, pomfret, catfish, hairtail, croaker, shark, Indian salmon, Bombay duck and jewfish. Hilsa is the only single-species pelagic fishery in the commercial sector operated with mechanized boats.

During the last two decades, marine fisheries has expanded rapidly, thanks to initiatives taken in the 1970s. The marine catch has gone up from only 95 000 tonnes in 1975-76 to about 455 207 tonnes in 2003-2004. The sector has an estimated 22 500 non-mechanised and 21 400 mechanised fishing boats plus 120 industrial trawlers (46 shrimp trawlers, 74 finfish trawlers).

This fleet has been permitted to expand with a further 50 trawlers for fin fish to be used in the deeper waters of the EEZ. More than 167 400 fishermen are employed in marine fisheries, and an estimated 185 000 people in shrimp fry collection. At present, only one-third of the EEZ is covered by these fishing vessels.

Artisanal fishing crafts and gear

Artisanal fishing operations in the estuaries and coastal waters used to be carried out by traditional craft until the mid-1960s. The process of mechanisation was started in 1966 (through the Bangladesh Fisheries Development Corporation and the Bangladesh Jatio Matshyajibi Samabay Samity) with import and introduction of marine engines. According to a survey conducted by the DOF in 1984-85, a total of 17 331 boats were in operation in the marine artisanal and small-scale fishery, of which 3 317 were mechanised boats. A later survey (in 2001) showed a drastic increase in mechanized boats to 22 500. But only about 5 000 of these are registered by the MMD.

Three types of traditional boats exist in the country. These are plank-built "Dingi" and "Chandi" and dugout 'Balam'. These boats are operated by oar/ sail. The Dingi, Chandi and Balam are 6-7 m, 10-15 m and 10-20 m in length respectively. These boats are mainly used for ESBN and gillnets. Mechanised boats are operated by 9-33 HP engine with 6-10 crew on board. The gross tonnage of these boats is 7-8. But most of them catch only 2-3 tonnes per trip of 4-6 days. The gear mostly used with these boats are drift gillnets, behundi nets (MSBN) and longlines.

Artisanal fishing gear include those operated by mechanised, motorised and country boats. There are five different types of gill nets, three types of set bagnets, trammel net, bottom longline, beach seine and shrimp seed collecting gear. The ESBN are the most widely used and widely distributed artisanal fishing gear in Bangladesh, as in several other neighbouring countries.

Monitoring, control and surveillance (MCS)

The MCS system exists in practice only for the industrial trawl sector. A practical approach would be to deploy limited MCS units at coastal ports and rely heavily on stakeholder management, with the traditional village community structure providing the basis for MCS. Ideally, MCS should be implemented by a combination of mechanisms – licensing by the authority and monitoring of gear and landings at designated ports. The prospects for co-operative stakeholder policing in this sector are poor, but there are no alternative strategies. At present, a speedy MMD system for licensing mechanised boats is in progress.

Management issues:

Management of marine fisheries focuses on the industrial trawl sector, and is carried out by a marine wing based in Chittagong. There is no management and monitoring of the artisanal sector which operates out of Barisal, Bhola, Patuakhali, Barguna and other areas where fishing pressure is heavy. Community participation in management planning and implementation is totally absent.

Fishermen's safety measures and the provisions of the Marine Fisheries Ordinance (MFO), 1983

This ordinance prohibits some methods of fishing, names fish species that cannot be caught during a particular season, stipulates mesh sizes of fishing nets, prohibits the landing and carrying of fish below a certain size and catching of fish species at certain times of the year.

The ordinance has provisions for regular monitoring of fishing effort and monitoring of fish catches. But safety measures for fishers are not covered by this ordinance. It should be reviewed and safety protocols included.

Licensing of fishing vessels

There is a substantial discrepancy in fleet size figures between the MMD (which has registered 4 000 mechanised vessels) and the DOF (which says that the fleet comprises 50 595 vessels).

The 1999/ 2000 DOF estimate of 28 698 vessels for the artisanal fleet may be reasonable.

Status of GoB programmes for fishermen's safety at sea

The DoF routinely carries out a dialogue with the MMD, which is principally responsible for fishers' safety at sea, and with other departments that are concerned with fishers' safety measures *e.g.* the Disaster Management Bureau, the Bangladesh Coast Guard and the Bangladesh Navy.

The DOF brought in an interesting community programme to strengthen sea safety – introduction of community radio in the coastal district of Cox's Bazar. This was done through the FAO/ UNDP's Empowerment of Coastal Fisher Community Project (ECFC). The project encourages coastal communities to organise themselves into attaining their collective goals – economic, social, educational and political.

Coastal district fishery officers have now been empowered to take up fisheries licensing and legislative work. This is a follow-up to the recently developed Marine Fisheries Strategy Document which has said that nursery grounds up to five kilometers from the coastline should be protected to strengthen recruitment in deeper waters.

Bangladesh Fishing Vessel Safety Equipment Rules, 2005

Fishers' safety at sea is covered by rules framed under the Bangladesh Merchant Shipping Ordinance, 1983 — the Bangladesh Fishing Vessel Safety Equipment Rules, 2005, to be specific. However, the MMD is not in a position to effectively undertake the registration survey (prescribed in the rules) or examine vessel sea worthiness and safety equipment on board, because it is short of manpower and there are no office establishments all along the coast line. The power of boat licensing has been delegated to Coastal District Fishery Officers. So the MMD and coastal district fishery officers should work together to make boat licensing effective.

Rules framed under Bangladesh Merchant Shipping Ordinance, 1983 (Ord XXVI of 1983)

Some relevant provisions (those that relate to sea safety) are:

1. Marking of vessels: The name of the vessel should be entered in bright colours on a dark background.
2. Marking with retro-reflective materials: Everything including life jackets.
3. Stowage of safety appliances.
4. Training manual on board fishing vessels.
5. Fishing vessel safety certificate.
6. Life-saving appliances.
7. Radio equipment.
8. Navigational equipment/ aids.
9. Fire-fighting appliances.

NGO activities and community organisations in coastal fisheries

Training and awareness programmes are being undertaken to some extent by some NGOs. These programmes are presently being done separately by each of the NGOs. But jointly planned and implemented programmes would be far more effective.

Fisher safety issues addressed by the DoF/ FAO ECFC Project

The philosophy of the ECFC Project was based on sustainable livelihoods. This Technical Assistance Project, piloted in 118 fishing villages of Cox's Bazar district, aimed at empowering coastal fishing communities. Currently the project is attempting to implement its exit strategy.

Several lessons have been learnt from the ECFC model. These can be considered as Best Practices, as key elements for sustainability. They cover all stages of project formulation, implementation and post-project activities. They enable the project to organise, mobilize and manage human capital towards achieving collective economic, social, educational and political goals.

Government agencies, community organisations and donor agencies are keen to expand this model to the rest of the country.

Socio-economic development and capacity-building

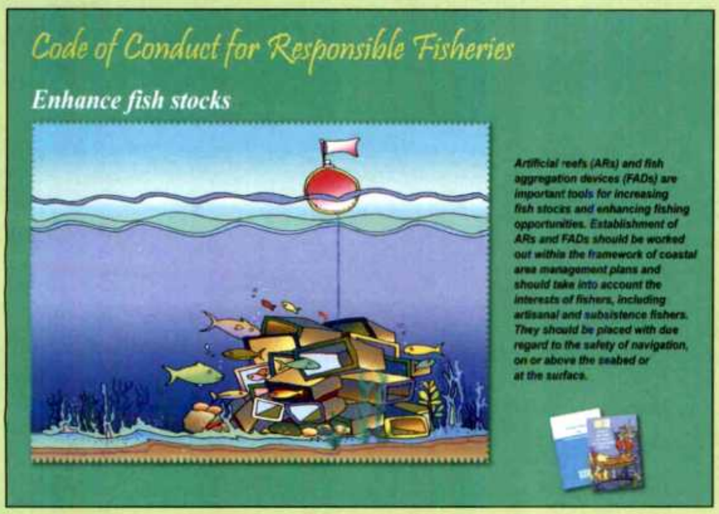
A major weakness of marine fisheries administration in Bangladesh is that it is weakly staffed; technological know-how is inadequate and limited to fishery biologists. There are no experts/ professionals in several areas of marine fisheries. For example, no gear technologists, fishery economists or socio-economists.

A GoB- funded project is in the pipeline to address the issues of rehabilitation of the fishers and their safety at sea. The DoF will help develop a sustainable community radio programme, through institutional soft credit support.

The way forward

The DoF should be pro-active in liaising with other ministries to ensure that rules related to the safety of fishers at sea are implemented. The MMD (Ministry of Shipping), the Bangladesh Navy and Coast Guard and the Disaster Management Bureau should be involved in the effort through an institutional coordination mechanism. Assistance from international organisations such as the FAO may be obtained in this context, perhaps under the umbrella of the Code of Conduct for Responsible Fisheries.

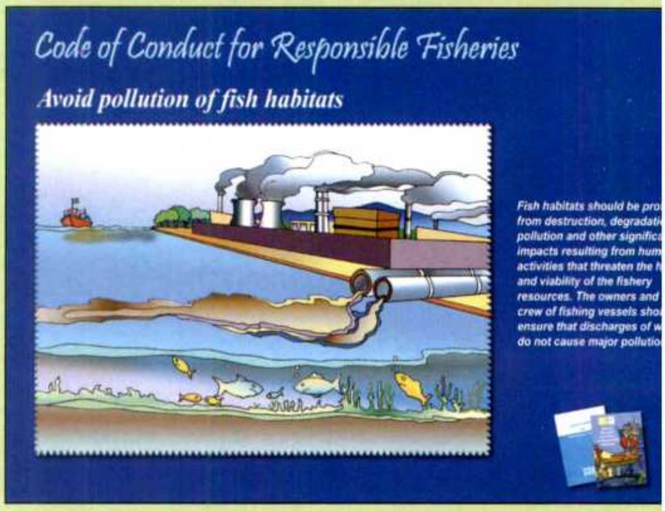
BOBP-IGO Posters Promote Code of Conduct for Responsible Fisheries



Code of Conduct for Responsible Fisheries

Enhance fish stocks

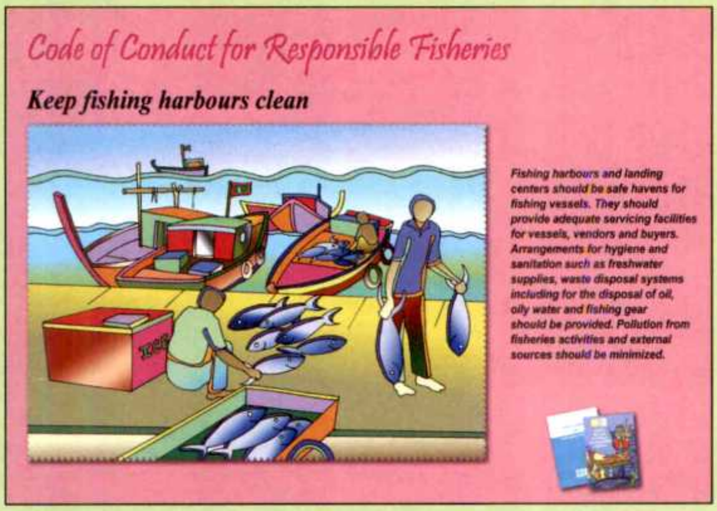
Artificial reefs (ARs) and fish aggregation devices (FADs) are important tools for increasing fish stocks and enhancing fishing opportunities. Establishment of ARs and FADs should be worked out within the framework of coastal area management plans and should take into account the interests of fishers, including artisanal and subsistence fishers. They should be placed with due regard to the safety of navigation, on or above the seabed or at the surface.



Code of Conduct for Responsible Fisheries

Avoid pollution of fish habitats

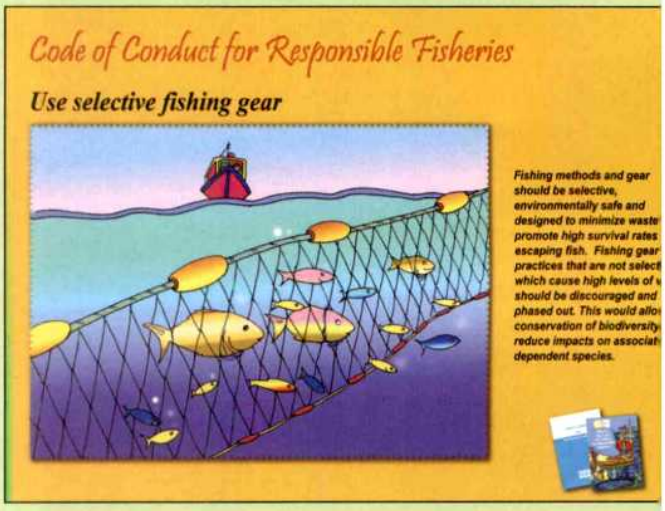
Fish habitats should be pro
from destruction, degradati
pollution and other signific
impacts resulting from hum
activities that threaten the h
and viability of the fishery
resources. The owners and
crew of fishing vessels sho
ensure that discharges of w
do not cause major pollutio



Code of Conduct for Responsible Fisheries

Keep fishing harbours clean

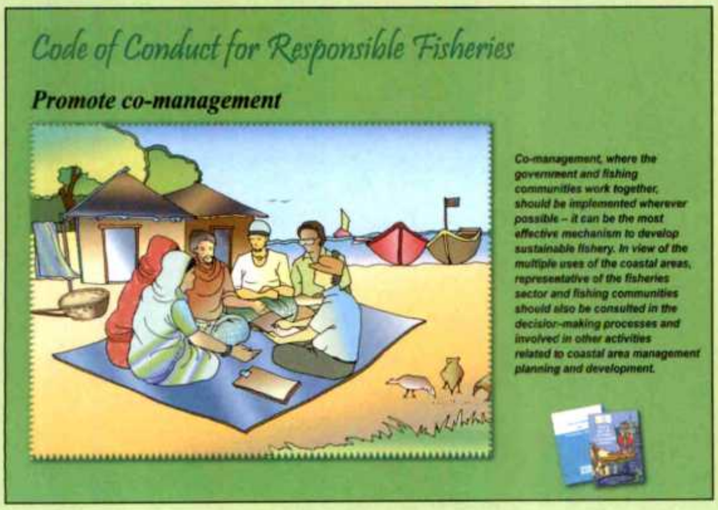
Fishing harbours and landing centers should be safe havens for fishing vessels. They should provide adequate servicing facilities for vessels, vendors and buyers. Arrangements for hygiene and sanitation such as freshwater supplies, waste disposal systems including for the disposal of oil, oily water and fishing gear should be provided. Pollution from fisheries activities and external sources should be minimized.



Code of Conduct for Responsible Fisheries

Use selective fishing gear

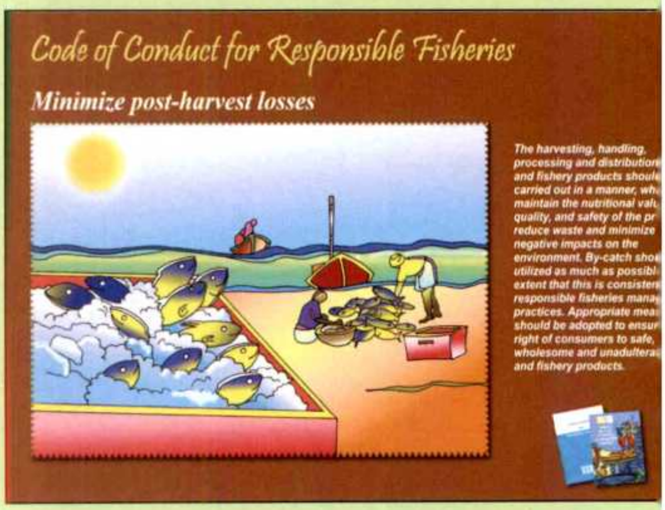
Fishing methods and gear
should be selective,
environmentally safe and
designed to minimize waste
promote high survival rates
escaping fish. Fishing gear
practices that are not select
which cause high levels of
should be discouraged and
phased out. This would allo
conservation of biodiversity
reduce impacts on associat
dependent species.



Code of Conduct for Responsible Fisheries

Promote co-management

Co-management, where the government and fishing communities work together, should be implemented wherever possible – it can be the most effective mechanism to develop sustainable fishery. In view of the multiple uses of the coastal areas, representative of the fisheries sector and fishing communities should also be consulted in the decision-making processes and involved in other activities related to coastal area management planning and development.

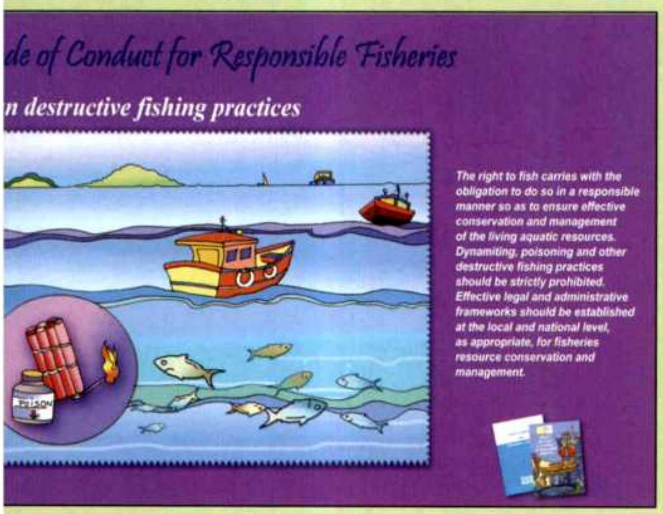


Code of Conduct for Responsible Fisheries

Minimize post-harvest losses

The harvesting, handling,
processing and distribution
and fishery products shoul
carried out in a manner, wh
maintain the nutritional val
quality, and safety of the pr
reduce waste and minimize
negative impacts on the
environment. By-catch sho
utilized as much as possibl
extent that this is consiste
responsible fisheries mana
practices. Appropriate mea
should be adopted to ensur
right of consumers to safe,
wholesome and unadultera
and fishery products.

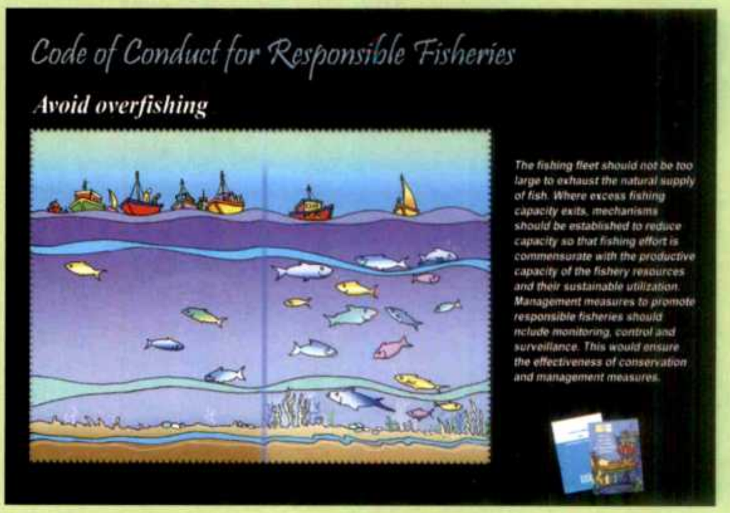
The Code of Conduct for Responsible Fisheries sets out principles and standards of behaviour for responsible fisheries and aquaculture practices. The BOBP-IGO has brought out a dozen posters to dramatize the Code's messages, such as: Enhance fish stocks. Avoid pollution of fish habitats. Ban destructive fish practices. Avoid overfishing. Encourage people's participation. Use selective fishing gear. Promote co-management. The posters will be widely distributed in the member-countries.



de of Conduct for Responsible Fisheries

n destructive fishing practices

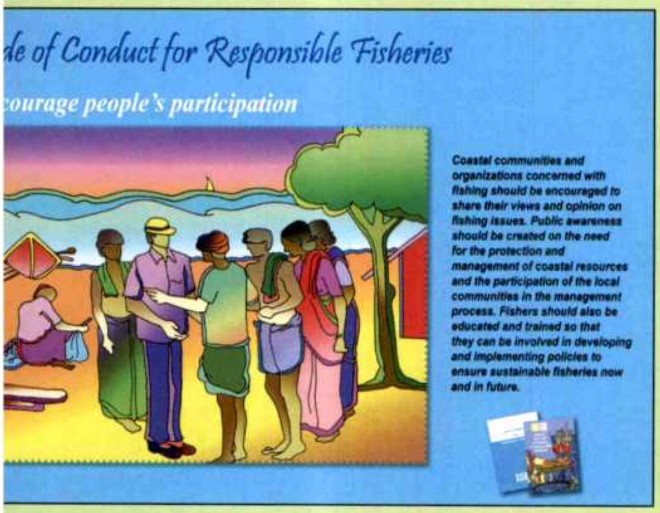
The right to fish carries with the obligation to do so in a responsible manner so as to ensure effective conservation and management of the living aquatic resources. Dynamiting, poisoning and other destructive fishing practices should be strictly prohibited. Effective legal and administrative frameworks should be established at the local and national level, as appropriate, for fisheries resource conservation and management.



Code of Conduct for Responsible Fisheries

Avoid overfishing

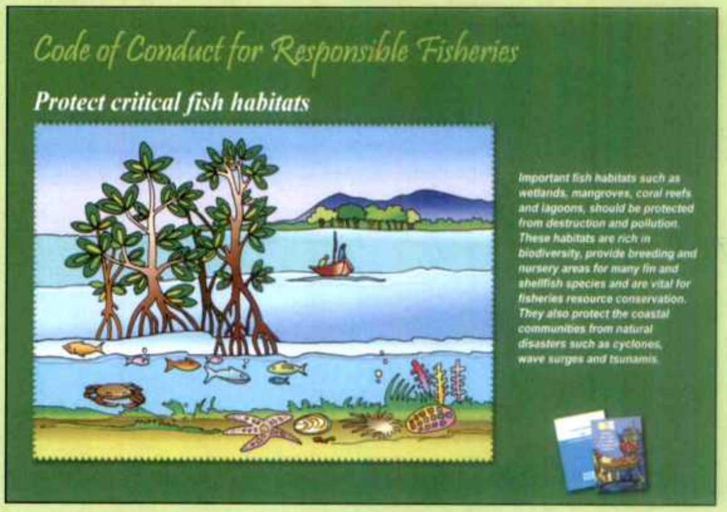
The fishing fleet should not be too large to exhaust the natural supply of fish. Where excess fishing capacity exits, mechanisms should be established to reduce capacity so that fishing effort is commensurate with the productive capacity of the fishery resources and their sustainable utilization. Management measures to promote responsible fisheries should nclude monitoring, control and surveillance. This would ensure the effectiveness of conservation and management measures.



de of Conduct for Responsible Fisheries

courage people's participation

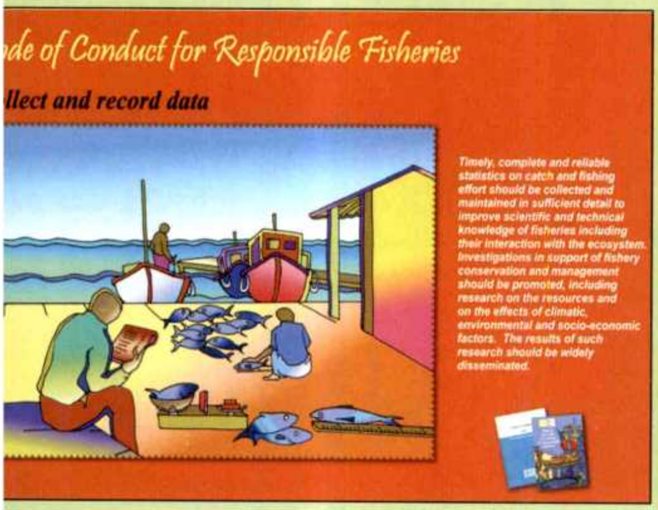
Coastal communities and organizations concerned with fishing should be encouraged to share their views and opinion on fishing issues. Public awareness should be created on the need for the protection and management of coastal resources and the participation of the local communities in the management process. Fishers should also be educated and trained so that they can be involved in developing and implementing policies to ensure sustainable fisheries now and in future.



Code of Conduct for Responsible Fisheries

Protect critical fish habitats

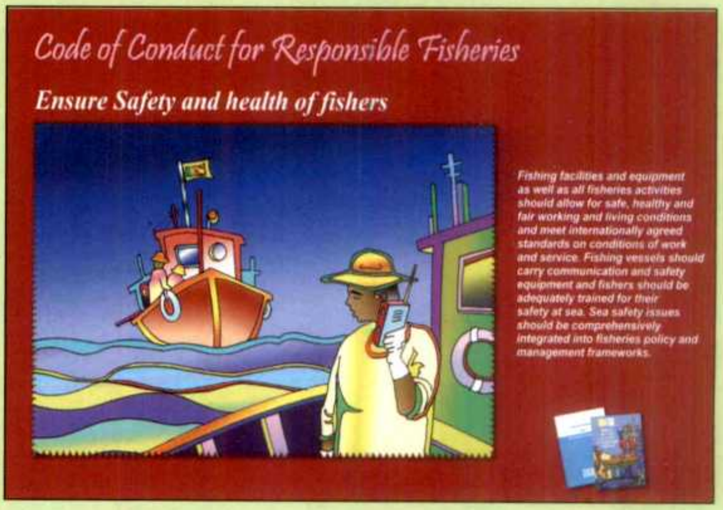
Important fish habitats such as wetlands, mangroves, coral reefs and lagoons, should be protected from destruction and pollution. These habitats are rich in biodiversity, provide breeding and nursery areas for many fin and shellfish species and are vital for fisheries resource conservation. They also protect the coastal communities from natural disasters such as cyclones, wave surges and tsunamis.



de of Conduct for Responsible Fisheries

llect and record data

Timely, complete and reliable statistics on catch and fishing effort should be collected and maintained in sufficient detail to improve scientific and technical knowledge of fisheries including their interaction with the ecosystem. Investigations in support of fishery conservation and management should be promoted, including research on the resources and on the effects of climatic, environmental and socio-economic factors. The results of such research should be widely disseminated.



Code of Conduct for Responsible Fisheries

Ensure Safety and health of fishers

Fishing facilities and equipment as well as all fisheries activities should allow for safe, healthy and fair working and living conditions and meet internationally agreed standards on conditions of work and service. Fishing vessels should carry communication and safety equipment and fishers should be adequately trained for their safety at sea. Sea safety issues should be comprehensively integrated into fisheries policy and management frameworks.

Development of Marine Fisheries in India- Role of the Fishery Survey of India

The Fishery Survey of India (FSI) surveys and assesses marine fishery resources in India's Exclusive Economic Zone (EEZ) to ensure optimum utilization and sustainable development of these resources. The FSI is a part of the Department of Animal Husbandry, Dairying and Fisheries in the Ministry of Agriculture.

R & D in fisheries in India perhaps began in 1946 with the establishment of the Deepsea Fishing Station. It was meant to augment food supply through development of deepsea fishing during the post-second World War. Beginning with just one vessel (a mine sweeper converted to a trawler, **S.T. Meena)** and a few staff, the FSI by 1982 had 28 vessels of varying size operating from 12 bases.

With the declaration of the 200 nautical mile EEZ during 1976, the Government of India started acquiring large vessels to survey demersal, mid-water, pelagic and oceanic resources in the EEZ. In 1983, the FSI was reorganized and upgraded as a national institute with a new set of mandates. Headquartered in Mumbai, the FSI has six zonal bases at Mumbai, Mormugao, Kochi, Chennai, Visakhapatnam and Port Blair. It was recognized as a science & technology institute in 1988.

The institute's sanctioned staff strength of 812 includes scientists, engineers, technicians and administrative staff.

The FSI seeks to meet the data needs of the Indian marine fishing industry for optimizing fishery production, also for regulating resources conservation and environmental protection.

Since its inception, the institute's vessels have engaged in demersal (bottom) trawling, mid-water trawling, purse seining, tuna longlining and squid jigging. The present survey fleet focuses on deepsea and oceanic resources and consists of 13 ocean-going vessels of 30.5 - 40.5 OAL equipped with state-of-the-art equipment for navigation, fish finding and resources survey.

The FSI is a recognised Marine Data Centre under the National Ocean Information System coordinated by the Department of Ocean Development. It holds 50 000 electronic records; about 2 500 are added annually. Scientists take part in survey cruises to collect data relating to fishery resources distribution and abundance in space and time. They also collect biological information and data on oceanographic parameters.

The data collected are processed and published in the form of charts, atlases, bulletins, etc. from time to time, catering to a spectrum of data users.

Apart from publications, the FSI disseminates findings through workshops, seminars, open houses and exhibitions in different maritime states to benefit fishermen, fishing boat operators, etc.

Dr V S Somvanshi became Director-General of the Fishery Survey of India in August 1995, after 15 years of service with the FSI. He has vast experience in marine fisheries research, particularly in fishery resources surveys and assessment and fish biology. He has edited two books, published more than 100 scientific papers, and visited several countries in Europe, Asia and Africa in the course of professional assignments.

Between 1997 and 2002, he served as Vice-Chairman of the Scientific Committee of the Indian Ocean Tuna Commission. He has been a principal investigator on several national and international projects, has served on many R& D committees, and is a Ph.D research guide at several universities.

Publications

Data products	Issues
Fishery Charts	4
Fishery Atlases	2
Bulletins	28
Occasional Papers	11
Special Publications	5
Chartered Vessels Series	8
Proceedings	6
Resources Information Series (Hindi, English, Marathi, Tamil, Telugu, Malayalam, Konkani, Kannada, Oriya)	77
Extension Series	1

मीना समाचार
MEENA News

Some facts relating to the surveys:

- Demersal resources have been surveyed in all coastal sectors. Stocks are under advanced levels of exploitation.The institute has located a number of new fishery resources and fishing grounds of deepsea lobsters off the south west coat, spear lobster *(Linuparus sommiosus)* and deep sea lobsters *(Puerulus sewelli)* in Andaman waters.
- FSI has been investigating demersal stocks in the outer continental shelf. Intensive trawl surveys are being used to cover all the sectors.
- FSI has done a preliminary survey of neritic pelagic stocks in some sections of the Indian coast by means of mid-water trawling and purse-seining
- Trawl surveys are in progress for obtaining a complete picture of several stocks of deepsea crustaceans and finfishes in different sectors of the continental slope.
- FSI is doing tuna longline surveys to generate scientific

FSI's Survey Fleet

Name of Base and Vessel	Vessel Type	OAL (m)	GRT (t)	BHP	Built in	
					Year	Country
Mumbai						
Yellow Fin	Tuna longliner	36.0	290	800	1989	Japan
Matsya Vrushti	Monofilament longliner	37.5	465	1100	2005	China
Matsya Nireekshani	Stern trawler	40.5	329.26	2030	1978	Holland
Mormugao						
Matsya Vishwa	Stern trawler	36.5	327.18	825	1983	India
Sagarika	Stern trawler	28.8	189	650	1994	Japan
Cochin						
Matsya Varshini	Trawler-cum-Purse-seiner	36.5	268.80	1160	1980	Denmark
Matsya Sugundhi	Longliner-cum-Squid jigger	31.5	245.80	650	1980	Japan
Lavanika	Stern trawler	24.0	151	500	1995	1995
Chennai						
Matsya Drushti	Monofilament longliner	37.5	465	1100	2005	China
Samudrika	Stern trawler	28.8	189	650	1994	India
Visakha patnam						
Matsya Shikari	Stern trawler	39.5	352	740	1979	Holland
Matsya Darshini	Stern trawler	36.5	268.80	1160	1980	Denmark
Port Blair						
Blue Marlin	Tuna longliner	36.0	290	800	1989	Japan

FSI's Charter of Work

1. Survey and assessment of fish stocks and charting of fishing grounds in the Indian EEZ and adjoining high seas.
2. Monitoring of fishery resources for fisheries regulation, management and conservation.
3. Assessment of suitability of deepsea fishing gear with special reference to the concepts of maximum sustainable yield, preservation of the environment and the marine ecology.
4. Marine fisheries forecasting including application of remote sensing in fisheries management.
5. Maintaining data on deepsea fishery resources and dissemination of information to different user groups.
6. Human resources development through training of fishing operatives and assistance to sister institutes in meeting their faculty requirements.

knowledge and a sound data base on distribution, availability, seasonality and migratory trends of larger pelagic stocks in the Indian EEZ and adjoining high seas.

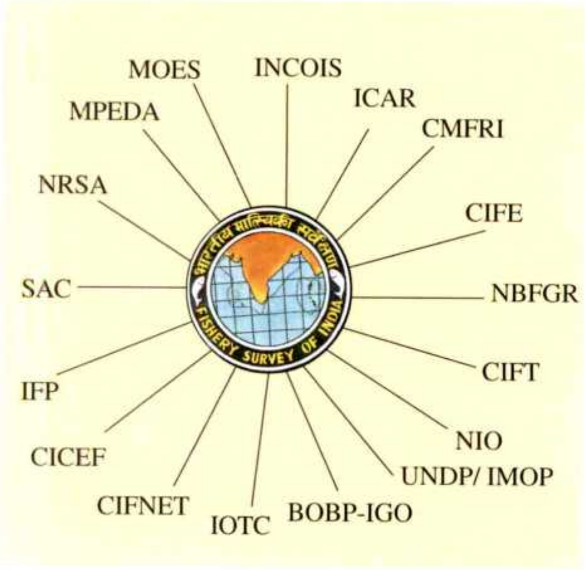
- Through two recently acquired monofilament longliners, Matsya Vrushti and Matsya Drushti, FSI is in the process of popularizing the monofilament longlining technique.
- FSI is currently surveying demersal resources in the deeper waters and continental slope and doing longline surveys for larger pelagic stocks in the EEZ around the A&N islands.
- FSI has initiated studies on krill resources in the Indian Ocean sector of the southern ocean.
- To promote technologies and fishing gear which will not further degrade the marine ecosystem, FSI undertakes fishing with eco-friendly and diversified fishing methods like squid jigging, trap fishing, etc.
- FSI is building up a species inventory of marine fishery resources in the Indian EEZ so as to take measures for monitoring and conservation of marine bio-diversity.
- The FSI has arrived at a figure of 3.92 million tonnes of fishery potential in the Indian EEZ by using different analytical and production models suitable for tropical fisheries. Variabilities of stock densities and biomass of important stocks are being assessed on a yearly basis.
- FSI has been associated with ISRO institutes in developing techniques and in validating the application of remote sensing in marine fisheries.

Human Resource Development

The FSI provides practical on-board training to deepsea fishing operatives and fishermen of maritime states in different fishing methods. It also gives on-board sea-service training to CIFNET trainees so that they become eligible to appear for certificate of competency examinations.

Training is imparted to individual scientists in fish stock assessment, taxonomy, fishing gear, fishery oceanography, etc. FSI is recognized by Mumbai University as a research centre for undertaking studies leading to M Sc (by research) and Ph D degrees. FSI bases have also won recognition from universities in the respective regions.

FSI's Institutional Linkages



Tasks ahead

Short term vision

- Monitoring of demersal resources within 200m depth zone.
- Survey of deepsea demersals beyond 200m depth.
- Survey of coastal pelagic resources.
- Survey of oceanic tuna resources.
- Survey of skipjack and yellowfin tuna by pole and line fishing in Lakshadweep and Andaman & Nicobar Group of Islands.
- Introduction of monofilament longlining for exploration and exploitation of tuna resources.
- Fish stock identification and biodiversity studies using fish genetics.
- Application of remote sensing in forecasting of marine fisheries.
- Investigation of fishery resources in the high seas in the Indian Ocean and Southern Ocean.

Long-term vision

- Completion of exploratory surveys for all types of fishery resources in the Indian EEZ.
- Commercial fishing technologies and innovations.
- Monitoring surveys for fish stock health in the Indian EEZ and fishery strategies.
- Data bank maintenance and networking.
- Large marine ecosystems approach for conservation, management of resources and preservation of environment.
- Habitat management – assessment of risks to habitat.
- Environmental impact of fishing on protected species.
- Sustainable fishery and enhanced food security.

The FSI has vital linkages with several national agencies and institutions associated with ocean studies and fisheries development

The FSI is the nodal institute of the Government of India for matters related to Indian Ocean Tuna Commission (IOTC). Recently, for the first time in India, FSI successfully conducted a tuna tagging programme in the Lakshadweep Islands. FSI is also represented in the Technical Advisory Committee of the BOBP-IGO.

The Government of India's Centrally Sponsored Scheme (CSS) on development of marine fisheries, infrastructure and post-harvest operations, is being implemented through FSI: existing trawlers are converted for monofilament longlining. Likewise, under the CSS on strengthening of databases and information networking for the fisheries sector, FSI conducted a marine fisheries census in Lakshadweep and Andaman and Nicobar Islands and also conducted eight training sessions-cum-workshops on "Strengthening of data collection and fish taxonomy". The FSI also acts as an interface between the Ministry and fishery departments of coastal states for catch assessment surveys in marine fisheries.

The FSI maintains a database of Indian-owned fishing vessels permitted by the Government of India to engage in deepsea fishing in the Indian EEZ. The FSI has played an important role in implementing inter-institutional and international projects.

The FSI is a premier organization in surveying and assessing fish stocks in India. It has helped to popularize various modern fishing techniques, train operatives, apply remote sensing in marine fisheries, promote the Code of Conduct for Responsible Fisheries and eco-friendly fishing techniques. For more details, please visit the website http:// fsi.bom.nic.in

Projects implemented by FSI

1. ICAR-funded project on ***"Investigation on biology of perches in Quilon Bank, Wadge Bank and Gulf of Mannar"***.
2. GEF/IMO/UNDP-funded project on ***"Glo-ballast water port baseline survey"***.
3. ICAR-funded project ***"To study the present status of the polynemid fishery along the Maharashtra-Gujarat coasts and to suggest a suitable gear for their sustainable exploitation"***.
4. Project funded by Ministry of Environment & Forests, New Delhi, on ***"Investigation in Marine Fish Biodiversity in the Indian EEZ"***.
5. Project funded by Space Application Centre (SAC), Ahmedabad, on ***"Application of Remote Sensing and GIS for Marine Fisheries Resources Management"***
6. Project funded by SAC, Ahmedabad on ***"Species-specific fishery forecast"***.
7. Project funded by INCOIS on ***"Development of Integrated Fishery Forecast Model off the Visakhapatnam Coast"***.
8. Project funded by IOTC on "**Small -scale tuna tagging in Lakshadweep Islands**"

The newly acquired fishing vessels of FSI (top & bottom)

मत्स्य दृष्टि
MATSYA DRUSHTI
F-MUM-0059

How did the World Fare in Fisheries and Aquaculture in 2004? Let's take a look at SOFIA 2006

THE STATE OF WORLD FISHERIES AND AQUACULTURE
2006
world fisheries and aquaculture
ATLAS

The State of World Fisheries and Aquaculture, 2006 (SOFIA 2006) is out – FAO's authoritative wide-ranging macro-analysis of global fisheries and aquaculture for 2004.

SOFIA is perhaps the best-known five-letter word in fisheries! It is the product of a regular exercise carried out by FAO staff and consultants, based on data worldwide. Because of the time taken to collect, compile, assemble and analyse data globally, arrive at conclusions, then present and disseminate it, SOFIA 2006 deals with 2004.

SOFIA 2006 takes up about 175 pages. Like its predecessors, it is in four parts. Part I is a review of world fisheries and aquaculture. Part 2 discusses select issues facing fisheries and aquaculture. Part 3 highlights special FAO studies. Part 4 is an "outlook" for the future. The book comes with a CD-ROM containing a "World fisheries and aquaculture atlas",

This article provides glimpses into the 175-page publication – facts, insights, revelations. (For a copy of this important publication, you may write to the Sales and Marketing Group, Electronic Publishing Policy and Support Branch, FAO, Via delle Terme di Caracalla, 00153 Rome, Italy.)

Part 1: World Review of Fisheries and Aquaculture

Part 1, containing 60 pages, is the biggest part of SOFIA 2006. It is devoted to "Fisheries resources: trends in production, utilization and trade". What appears below is a summary of the 6-page "Overview" of trends in fish production, utilization and trade worldwide, with which Part 1 begins.

Capture fisheries and aquaculture supplied the world with about 106 million tonnes of food fish in 2004. Of this total, aquaculture accounted for 43 percent. Per capita supply works out to 16.6 kg, the highest on record, but to 13.5 kg if China is excluded. Overall, fish provided more than 2.6 billion people with at least 20 percent of their average per capita animal protein intake.

Outside China, per capita supply has shown a modest growth rate of about 0.4 percent per year since 1992 (following a decline from 1987). The rising numbers in aquaculture supply more than offset the effects of static capture fishery production and a rising population.

Preliminary estimates for 2005 indicate that total world fishery production reached almost 142 million tonnes, an increase of over 1 million tonnes compared with 2004. Although the total amount of fish available for human consumption is estimated to have increased to 107 million tonnes, the global per capita supply remained at about the same level as in 2004 because of population growth.

China remains by far the largest producer, with a reported fisheries production of 47.5 million tonnes in 2004 (16.9 and 30.6 million tonnes from capture fisheries and aquaculture, respectively). But as in earlier years, there are indications that statistics for capture fisheries and aquaculture production for China may be too high. This problem has existed since the early 1990s.

Because of the importance of China and the uncertainty about its production statistics, China is generally discussed separately from the rest of the world.

Global capture fisheries production reached 95 million tonnes in 2004, with an estimated first-sale value of US $ 84.9 billion. China, Peru and the United States remained the top producing countries.

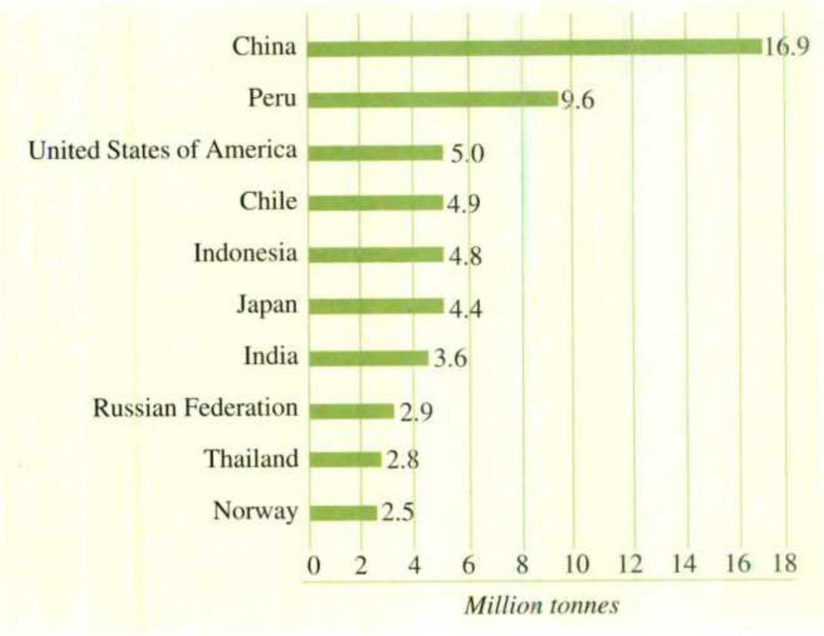
World capture fisheries production has been relatively stable in the past decade. The exception relates to marked fluctuations in catches of Peruvian anchoveta in the Southeast Pacific. Total marine catches accounted for 85.8 million tonnes in 2004.

The Mediterranean Sea and the Black Sea remained the most stable marine areas in terms of capture production. Catches from inland waters, about 90 percent of which occur in Africa and Asia, have shown a slowly but steadily increasing trend since 1950, owing in part to stock enhancement practices, and reached a record 9.2 million tonnes in 2004.

Aquaculture continues to grow more rapidly than all other animal food-producing sectors, with an average annual growth rate of 8.8 percent per year since 1970, compared with only 1.2 percent for capture fisheries and 2.8 percent for terrestrial farmed meat production systems. However, there are signs that the rate of growth for global aquaculture may have peaked, although high growth rates may continue for some regions and species.

Aquaculture production in 2004 was reported to be 45.5 million tonnes with a value of US $ 63.3 billion. Of

Marine and inland capture fisheries: top ten producer countries in 2004



World fisheries and aquaculture production and utilization

	2000	2001	2002	2003	2004	2005[1]
	(million tonnes)					
Production						
Inland						
Capture	8.8	8.9	8.8	9.0	9.2	9.6
Aquaculture	21.2	22.5	23.9	25.4	27.2	28.9
Total inland	**33.0**	**31.4**	**32.7**	**34.4**	**36.4**	**38.5**
Marine						
Capture	86.8	84.2	84.5	81.5	85.8	84.2
Aquaculture	14.3	15.4	16.5	17.3	18.3	18.9
Total Marine	**101.1**	**99.6**	**101.0**	**98.8**	**104.1**	**103.1**
Total Capture	95.6	93.1	93.3	90.5	95.0	93.8
Total Aquaculture	35.5	37.9	40.4	42.7	45.5	47.8
Total World Fisheries	**131.1**	**131.0**	**133.7**	**133.2**	**140.5**	**141.6**
Utilization						
Human consumption	96.9	99.7	100.2	102.7	105.6	107.2
Non-food uses	34.2	31.3	33.5	30.5	34.8	34.4
Population (billions)	6.1	6.1	6.2	6.3	6.4	6.5
Per capita food fish supply (kg)	16.0	16.2	16.1	16.3	16.6	16.6

Note: Excluding aquatic plants

[1] *Preliminary estimate*

the world total, China is reported to have accounted for nearly 70 percent of the quantity and over half the global value of aquaculture production. All regions showed increases in production from 2002 to 2004.

Freshwater culture continued to dominate, followed by mariculture and brackishwater culture. Carps accounted for 40 percent of all production of fish, crustaceans and molluscs. The period 2000-04 saw strong growth in production of crustaceans, in particular, and of marine fish.

In the same period, production in developing countries other than China increased at an annual rate of 11 percent, compared with 5 percent for China and about 2 percent for the developed countries. With the exception of marine shrimp, the bulk of aquaculture production within developing countries in 2004 comprised omnivorous/ herbivorous fish or filter-feeding species. In contrast, carnivorous species accounted for approximately three-quarters of finfish culture production in developed countries.

During the past three decades, the number of fishers and aquaculturists has grown faster than the world's population. In 2004, an estimated 41 million people worked as fishers and fish farmers, the great majority of these in developing countries, principally in Asia. The significant increase in numbers in recent decades is because of a strong expansion of aquaculture activities.

In 2004, fish farmers accounted for a quarter of the total number of fish workers in the primary sector. China has the highest number of fishers and fish farmers, reportedly 13 million in 2004, representing about 30 percent of the world total.

In China, fleet-size reduction programmes to tackle overcapacity are reducing the number of people engaged in capture fisheries. This number declined by 13 percent during the period 2001-04. In most industrialized countries, too, the numbers engaged in fishing and aquaculture are either declining or stationary.

The world fishing fleet comprised about 4 million units at the end of 2004, of which 1.3 million were decked vessels of various types, and 2.7 million undecked (open) boats. While virtually all decked vessels were mechanized, only about one-third of the undecked fishing boats were powered, generally with outboard engines. The remaining two-thirds were traditional craft of various types operated by sail and oars. About 86 percent of the decked vessels were concentrated in Asia.

Many countries are limiting the growth of national fishing capacity or reducing it – both to protect fishery resources, and to make fishing economically viable for harvesting enterprises. Overall, the number of fishing vessels worldwide did not change significantly in either 2003 or 2004.

Just as the world fishing fleet appears to have stabilized, the state of exploitation of the world's marine fishery resources has tended to remain relatively stable.

Over the past 10 to 15 years, the proportion of overexploited and depleted stocks has remained unchanged, after showing a marked increase during the 1970s and 1980s. It is estimated that in 2005, as in recent years, around one-quarter of the stock groups monitored by FA0 were under-exploited or moderately exploited. About half of the stocks were fully exploited, with no room for further expansion. The remaining stocks were either overexploited, depleted or recovering from depletion.

This confirms earlier observations that the maximum wild capture fishery potential from the world's oceans has probably been reached. Fisheries management is necessary to rebuild depleted stocks and prevent the decline of those being exploited close to their maximum potential.

In the case of inland fishery resources, there is widespread overfishing, arising from either intensive targeting of individual large-size species in major river systems or overexploitation of highly diverse species assemblages or ecosystems in the tropics.

Total world trade in fish and fishery products reached a record value of US$71.5 billion (export value) in 2004, representing a 23 percent growth relative to 2000.

In real terms (adjusted for inflation), exports of fish and fishery products increased by 17.3 percent during 2000-04.

China has been the world's main exporter since 2002, and in 2004 its fish exports were valued at US$ 6.6 billion. (China has recorded a remarkable average annual growth of 12 percent in the period 1992-2004.)

The fishery net exports of developing countries (*i.e.* the total value of their exports less the total value of their imports) have shown a continuing rising trend over the past two decades, growing from US $4.6 billion in 1984 to US $16 billion in 1994 to US $20.4 billion in 2004. These figures are significantly higher than those for other agricultural commodities such as rice, coffee and tea.

Shrimp continues to be the most important commodity traded in value terms, (16.5 % of the total value of internationally traded fishery products in 2004) followed by groundfish (10.2 %), tuna (8.7 %) and salmon (8.5%).

Marine fisheries governance: Regional fisheries management organizations (RFMOs) play a unique role in facilitating international co-operation for the conservation and management of fish stocks. These organizations are the only realistic means of governing fish stocks that occur either as straddling or shared stocks between zones of national jurisdiction, between these zones and the high seas, or exclusively on the high seas.

Strengthening RFMOs in order to conserve and manage fish stocks more effectively remains the major challenge facing international fisheries governance. (see pages 9-10)

Despite efforts over the past decade to improve their management capacity, some RFMOs have failed to achieve their fundamental goal of sustainable management of stocks.

For inland fisheries too, a system of governance is needed for transboundary fisheries and fishery resources. Many of the world's large river basins cross one or several international borders, and many riverine fish species migrate across boundaries. Result: activities in one country may affect fish stocks and communities exploiting the fish stocks in another country.

Unlike capture fisheries, aquaculture activities are generally located within national jurisdictions; governance in aquaculture is therefore a national responsibility. There is growing understanding that sustainable development of the aquaculture sector requires an enabling environment, with appropriate institutional, legal and management frameworks guided by an overall policy.

Notable progress has been made in a number of institutional, legal and management development areas, including the use of various public sector- private-sector partnership arrangements.

In recent years, issues relevant to international trade in fishery products have been prominent. They include labelling and traceability requirements; ecolabelling; illegal, unreported and unregulated (IUU) fishing; the sustainable development of aquaculture; subsidies in production and trade agreements. Some of these issues form a part of the agenda for the multilateral trade negotiations in the World Trade Organization (WTO).

Part 2: Selected Issues in Fisheries and Aquaculture

Part 2 of SOFIA 2006 contains a valuable discussion of select issues in fisheries and aquaculture. These take up 36 pages. Only a listing of these issues is possible in this article.

- The Code of Conduct for Responsible Fisheries: Moving into the Second Decade of Implementation.
- Sustainable growth and expansion of aquaculture: an ecosystem approach.
- The allocation of fishing rights: an evolving issue.
- Impact of market-based standards and labels on international fish trade.
- HIV and AIDS in fishing communities: a public health issue but also a fisheries development and management concern.

Part 3: Highlights of Special Studies

This 40-page section highlights some special studies conducted by the FAO.

These are listed below:

- Rehabilitation of riverine habitat for fisheries.
- Responsible fish trade and food security.
- Trash or treasure? Low-value/ trash fish from marine fisheries in the Asia-Pacific region.
- Conservation and management of shared fish stocks: legal and economic aspects.
- Marine capture fisheries management in the Indian Ocean: status and trends.
- Refuelling the fishing fleet.
- Causes of detentions and rejections in international fish trade.

Fish production in 2004 and projections for 2010 and later

	Simulation target year						
	2000	2004	2010	2015	2020	2020	2030
Information Source	FAO statistics[1]	FAO statistics[2]	SOFICA 2002[3]	FAO Study[4]	SOFIA 2002[3]	IFPRI study[5]	SOFIA 2002[3]
Marine capture	86.8	85.8	86		87		87
Inland capture	8.8	9.2	6		6		6
Total capture	95.6	95.0	93	105	93	116	93
Aquaculture	35.5	45.5	53	74	70	54	83
Total production	131.1	140.5	146	179	163	170	176
Food fish production	96.9	105.6	120		138	130	150
Percentage used for food fish	74%	75%	82%		85%	77%	85%
Non-food use	34.2	34.8	26		26	40	26

Note:All figures - other then percentages - are in million tonnes.

[1] Based on the statistics available to the FAO fishery information, Data and Statistics Unit in 2000.

[2] Based on latest statistics of the FAO Fishery Information, Data and Statistics Unit.

[3] FAO. 2002. The State of World Fisheries and Aquaculture 2002. Rome.

[4] FAO. 2004. Future prospects for fish and fishery products: medium-term projections to the years 2010 and 2015. FAO Fisheries Circular FIDI/972-1. Rome.

[5] International Food Policy Research Institute. 2003. Fish to 2020: supply and demand in changing global markets, by C. Delgado, N. Wada, M. Rosegrant, S. Meijer and M. Ahmed. Washington, DC.

Part 4: Outlook

The 11-page Part 4 of SOFIA 2006 describes the outlook for the future for fisheries and aquaculture, and does so in two parts. The first part revisits global projections for 2010 in fisheries and aquaculture contained in SOFIA 2004, in the light of what has happened since the projections were made. The second part summarizes important findings of a comprehensive FAO study on aquaculture.

What appears below provides a peek into both parts.

a) Revisiting global projections

World fisheries and aquaculture production have moved towards the figures predicted for 2010. Marine fisheries have reached a ceiling in terms of output. But a growing aquaculture sector is enabling per capita supplies of fish to remain almost constant.

Marine capture fisheries: The image of stagnation provided by marine capture fisheries is false. The stagnation in terms of output in no way reflects a stagnating sector. Not only are landings increasing in some fisheries (exemplified by the fisheries in the Northwest Atlantic) and decreasing in others, but the sector is continuously adjusting to changing political, economic and social environments.

While some stocks are recovering, there is no indication that landings for these stocks will expand to exceed the historical maximum sustainable yield levels.

It seems reasonable to expect that marine capture fisheries production will remain between 80 and 90 million tonnes per year, with an average somewhere in the middle of this range.

Freshwater capture fisheries: Contrary to projections, landings from inland fisheries have remained high and even increased somewhat. The projection for 2010 was that landings would have fallen to two-thirds of the 2000 level. However, the projection was based mainly on records from the organized commercial sector, and failed to take note of the larger subsistence sub-sector. Efforts are now under way by both FA0 and others to improve the official records for both commercial and non-commercial inland fisheries.

Aquaculture : Aquaculture (excluding aquatic plants) production continues to grow both in China and in the rest of the world. It is noteworthy that aquaculture production over the past four years has grown faster outside China (37 per cent) than in China (24 percent). It looks as if the prediction of 53 million tonnes of aquaculture production for 2010 will be met.

A first impression is that, at least during the rest of the current decade, aquaculture will contribute to future world fish supplies as was expected in 2000.

Fish utilization: Projections for 2010 were that the quantities of fish used for non-food purposes would decline from about 35 million tonnes per year to 26 million tonnes per year. This does not seem to be happening. In 2004, the quantities used for non-food uses were as high as four years earlier. The main reason seems to be increases in anchoveta landings in Chile and Peru.

b) Medium-term challenges and constraints for aquaculture

FA0 recently concluded a prospective analysis intended to provide insights into the future of aquaculture globally.

The process was complex. The analysis encompassed the preparation of national aquaculture sector overviews for more than 100 countries, five regional workshops, seven reports on regional aquaculture development status and trends, and a global expert survey on aquaculture development using the Delphi Technique.

The material developed in this way was synthesized to form a draft global review of the status and trends in aquaculture development. Subsequently, this document was submitted to a group of experts, who were requested to craft a 'prospective analysis of future aquaculture development.' Here are some highlights from the prospective analysis.

Of the many factors that determine the supply of aquaculture products, those outlined below are expected to play a lead role in the coming decades.

Access to land and water resources, and intensification

There is little new land available for fish farming in most countries

around the world, especially in Asia, the leading aquaculture producer. Land shortage is likely to remain one of the major constraints to aquaculture expansion globally.

Governments have taken various measures to address the issue, such as conversion of agriculture to aquaculture land, and integration of aquaculture into existing farming systems.

In the case of shrimp farming, most existing mangroves are protected against encroachment. Because there is no possibility of increasing land area, one solution is to intensify landbased production. In fact, intensification is becoming a growing trend in aquaculture worldwide. But costs go up with the level of intensification; not all farmers are expected to intensify.

The unavailability of freshwater could also limit future aquaculture development. Its use in aquaculture is frequently regarded as a loss for agriculture. In many cases, agriculture has been given priority in the allocation of water.

Access to adequate feed: fishmeal, fish oil and "low-value/ trash fish"
The use of aquafeeds will continue to play an important role in aquaculture development and production. Their availability and the cost of feed can be critical constraints to aquaculture.

With the predicted global increase in aquaculture production, the demand for aquafeed will continue to grow. One tends to be optimistic about the supply of fishmeal and fish oil for aquaculture feed. But demand from developing economies such as China may have a profound impact on overall supply and demand.

The use of low-value trash fish in aquaculture is also an important factor for future development. It is projected that, by 2013, China alone would require 4 million tonnes of low-value trash fish to sustain its marine cage culture. It seems the use of low-value trash fish in aquaculture feed is unlikely to be sustainable. There are also concerns that the continued use of low-value trash fish will generate environmental effects and biosecurity risks.

Greater capitalization and diversification of production systems and species: In spite of limited land and water resources, aquaculture entrepreneurs, attracted by high prices, are likely to find new ways of producing sufficient fish to meet demand.

Greater production requires greater capitalization. In the long run, aquaculture employers will have to use less labour and more capital to maintain the profit margins needed to stay in business. Therefore, an allocation of productive resources towards the production of high-commercial-value species, away from low-value species, can be expected.

Aquaculture of non-food species such as ornamental fish farming is an industry full of promise. Because of its growing potential for increasing rural employment and income and generating foreign exchange earnings, governments are increasingly promoting the culture and trade of ornamental fish. However, the outbreak of diseases is a threat to the development of this industry.

Ecotourism is an emerging industry and has the potential to spread throughout the world. A number of countries are promoting aquaculture-related ecotourism. Recreational fisheries in lakes and reservoirs play a significant role in Central and Eastern Europe.

In Malaysia, there is a growing interest in integrating aquaculture operations with tourism, such as marine cage culture and "put and take" fishing ponds. Offshore sites are a potential area where aquaculture-related ecotourism could be further developed.

The farming of seaweed has expanded rapidly. The seaweed industry provides a range of products generating an annual production value of US $ 5.5-6 billion. There are indications that the seaweed industry is likely to expand in the coming decades.

Access to capital: With progressive intensification and diversification of aquaculture to systems and species requiring sophisticated technologies, access to capital will be a key factor for development. Capital will be needed not only for investment and operating costs, but also for aquaculture insurance.

While access to capital might not be an issue in developed countries, it is certainly a stumbling block to aquaculture development in the developing world.

Environmental management: Intensification may sustain the profitability of farming operations, but it does so at a cost.

Farmer and consumer associations, civil society and institutional buyers such as supermarket chains and other key stakeholder groups are actively promoting the development of standards and codes aimed at ensuring an environmentally and socially responsible aquaculture. Such improvements have been noticeable worldwide for a number of commodities, particularly salmon.

Rising energy costs: Even before the current global energy crisis, energy costs represented an important share of the production costs in many commercial aquaculture operations. With further intensification and the use of more sophisticated technologies, it is likely that more energy will be needed, thereby exacerbating the energy cost problem.

As for land and water, aquaculture must compete with other activities for energy. To alleviate this problem, researchers around the world are seeking low-cost energy sources. More efficient pumps have been suggested as one of the options. Another is the use of recirculating systems. Wind-powered pumps are being used on a limited scale in freshwater aquaculture in many countries, but their capital cost is high.

Human resources development: Human resources development is pivotal to the future of aquaculture. Can progress in building the human capacity of the public and private sectors keep pace with new developments in technology, international trade and legislation?

Related issues, many of which are beyond the control of the aquaculture sector, include the so-called "brain drain", or migration of trained personnel from developing to developed countries, and the loss of human and social capital because of the effects of HIV and AIDS in many parts of the world, particularly in Africa, and natural disasters, such as the 2004 tsunami.

Research and development: As aquaculture continues to feel the pressure to expand, research and development will be a key. Research faces the challenge of providing policy-makers and practitioners with cutting-edge knowledge and innovations.

Aquaculture development has been hampered, however, by three factors relating to the fundamental requirements of research and development: insufficient funds, lack of core research staff and weak research infrastructure.

Information and communication technologies and networking :

Continuous dramatic advances in information and communications technologies are creating new opportunities for communication. Governments and other stakeholders in aquaculture development need to tap these opportunities. Information exchange through networking is likely to play an important role in the development of the sector.

Access to markets: Growing national and international markets and the ability to trade in these markets will strongly influence the growth of aquaculture. International trade of farmed fish has been going up.Trade expansion has also induced some countries to apply high import tariffs on fish and fishery products, to protect domestic aquaculture industries.

With the progressive liberalization of trade, tariffs have been lowered in many instances. However, non-tariff barriers have emerged as the main obstacle to trade and market access for exports to developed countries. Exporters are accused of dumping their products, or of benefiting from subsidies. These have led to import curbs and duties. Such disputes are increasingly being brought to the WTO for resolution.

As the industry grows and more aquaculture products move into international trade, the competition for market shares will become stiffer. More disputes can be expected. Access to export markets has also been complicated by regulations concerning product quality and safety requirements introduced by importing countries.

Given the significant contribution of developing countries to global aquaculture production, growing protectionism in developed countries would, of course, reduce aquaculture production in the developing world, and the per capita supply of fish.

The impact of increased protectionism will be felt most keenly by small producers. They may not be able to bear the high costs of compliance and may get pushed out of business. Market diversification may therefore play an important role. One outcome would be the development of niche markets, such as for organic aquaculture products or aquaculture ecolabels.

Further liberalization of fish trade under new agreements could provide new opportunities for expansion of aquaculture. Additionally, in many developing countries, domestic aquaculture industries compete with imports for domestic market shares. To overcome this problem, aquaculture producers and processors are slowly moving towards the development of processed products for both national and export markets.

This value-addition strategy is an avenue for improving the profitability of aquaculture enterprises. There is also a trend towards targeting local urban markets with standardized, value-added "easy-to-cook" or "super-market type" products. As competition for markets increases, these trends are likely to grow and intensify.

Sound policies and governance

Good governance, including political stability, has a major influence on aquaculture development. It reduces the costs of doing business, attracts investment into the sector and enhances the industry's competitiveness.

Greater aquaculture sustainability will be achieved by strengthening farmer associations and by encouraging self-regulation in the aquaculture industry. In many countries, there is no legislation specifically for aquaculture. Instead the sector is governed by a multiplicity of ad hoc laws.

In countries with incipient aquaculture industries, governments may invest substantial sums in building institutions and establishing governance arrangements for aquaculture. As law enforcement is a constraint in many countries, strong emphasis will be placed on increasing self-regulation through farmer associations. Self-regulation is likely to grow and become a norm.

Government support

Generally, a government's commitment to strong support for the aquaculture sector is a prerequisite for the sector's sustainable development.

The level of commitment will vary within and among regions. But it is expected that in countries where aquaculture contributes substantially to growth, poverty alleviation and food security, the commitment will hold, and that the level of support will increase.

Bangladesh Fisheries Research Institute: Powering New Technologies for Fisheries Development

Fish and fisheries are integral to the culture and heritage of Bangladesh, and play a significant role in nutrition, employment generation and foreign exchange earnings.

The Bangladesh Fisheries Research Institute (BFRI) was established in 1984. Its goals are:

- To carry out and coordinate research on fisheries and aquaculture in Bangladesh. A Board of Governors oversees execution of this mandate by providing policy and administrative guidance.
- To assist in the development of more economic and effective methods and technologies for fish production and eco-system management, and fisheries management.
- To provide training and research-based technology transfer.

BFRI serves as the national resource for technical information on fisheries. It generates and standardizes guidelines for country-wide extension of appropriate technologies in production and resource management. The extension is done by the Directorate of Fisheries as well as by other organizations within and outside government.

Though the Institute was established in 1984, actual operation started only two years later after staff got recruited and initial research facilities set up. The institute presently has some 80 scientists, half of whom have Ph Ds in aquaculture and fisheries disciplines from universities in Bangladesh or abroad. The institute assists the country in achieving the goals of fisheries development set out in successive development plans.

Institutional set up

The BFRI's headquarters is located at the south-west corner of the Bangladesh Agricultural University campus in Mymensingh, some 120 km north of the capital, Dhaka.

Besides the headquarters, BFRI has five research stations — the Freshwater Station, Mymensingh; Riverine Station, Chandpur; Brackishwater Station, Paikgacha, Khulna; Marine Fisheries and Technological Station, Cox's Bazar; and the Shrimp Research Station, Bagerhat. There are also five sub-stations – two dealing with freshwater, at Jessore & Sayedpur; and three riverine sub-stations at Rangamati, Santahar and Khepupara.

Freshwater Station (FS), Mymensingh : This 40 ha station, attached to the BFRI headquarters, is the institute's largest. It has well-established and sophisticated carp and prawn hatcheries, as many as 118 drainable ponds — consisting of 20 mini ponds, 52 nursery ponds (0.1 ha each), 47 rearing ponds (0.25 ha each) and 16 grow-out/brood stock ponds (1.6-2.6 ha each).

Riverine Station (RS), Chandpur : The 17.2 ha station is situated in the

Dr M A Mazid has been Director General of the BFRI from 1997, after 20 years as a senior officer in the government, and 11 years as teacher and researcher at the Bangladesh Agricultural University. He obtained an MS in marine biochemistry from Kagoshima University, Japan in 1978; a PhD in fish nutrition from Tokyo University of Agriculture in 1980; and a post-doctorate from Kagoshima University, Japan in 1983. He has served as National Project Director for several UN and international projects.

He has written four books and published more than 100 papers in national and international scientific journals. He is the founder-editor of the *Fisheries Newsletter* and the *Bangladesh Journal of Fisheries Research.*

His recent book *"Development of fisheries in Bangladesh: plans and strategies for increasing income and poverty alleviation"* is a significant contribution to fisheries development.

Dr Mazid has received the 20th Century Achievement Award from the American Biographical Institute. The BFRI under his leadership received a gold medal in recognition of its contribution to fisheries research and technology development in 1997.

riverine port city of Chandpur. It has 36 non-drainable ponds ranging in size from 0.12 to 0.37 ha each with a total water area of 8.6 ha. In addition, the station has one carp, one catfish and one prawn hatchery and specialized laboratories.

Brackishwater Station (BS), Paikgacha, Khulna : The only station of its kind in the country. It was established in 1987 to undertake R & D on various aspects of coastal aquaculture and fisheries management. The station is located at Paikgacha upzila under Khulna district and has an area of 30.56 ha. The station has 52 drainable experimental ponds of different sizes ranging from 0.05 to 1.0 ha, and an experimental hatchery for the production of prawn and commercially important brackishwater finfish seeds.

Marine Fisheries and Technology Station (MFTS), Cox's Bazar : This 4 ha station was established at Cox's Bazar in 1991. It is equipped with five specialized laboratories, an indoor cistern complex with 20 cisterns and an outdoor complex with 42 cisterns (200 m^2 each).

Research Achievements

Fisheries research has made a significant contribution to the growth of aquaculture by generating a number of economically viable, socially acceptable and environmentally compatible technologies. These are used by farmers large and small.

Highlights of BFRI's research achievements in aquaculture:

Breeding and seed production of commercially important fish, shrimp and endangered species : Research has been conducted to develop and refine the breeding techniques of commercially important fishes, and to disseminate techniques to the public and to private hatchery operators. Seeds are produced of four endemic major carps (catla, rohu, mrigal and calbasu), five major Chinese carps (silver carp, grass carp, bighead carp, black carp, common carp) and an exotic barb (silver barb), using artificial seed production techniques.

Hatcheries contribute about 99 percent of the total seed production, natural sources only 1percent. Artificial techniques of tiger shrimp and prawn breeding have also been developed by research and transferred to the field.

The BFRI has been conducting research on the conservation of fish biodiversity from 1994. It has successfully developed a package of technology for artificial breeding and seed production of some important threatened fish species using the technique of *in vitro* fertilization. Presently, live gene banks of 12 such threatened species – six carps (Mahseer, Olive barb, Rohu, Reba, Bata and Calbasu); five cat fishes (Pabda, Gulsha, Shingi, Magur and Guzi aor); and a climbing perch (Koi) have been established.

Genetic stock improvement of carp, catfish and tilapia: The BFRI has successfully initiated fish genetic research at the Freshwater Station (FS), Mymensingh since 1988. These generate better breeds and improved stocks for increasing fish production. Besides the institute's own research programmes, a number of international agencies (ICLARM, ACIAR/ CSIRO and DFID-AFGRP) have come forward to support some fish genetic research projects for developing advanced technologies.

Outstanding achievements have been recorded in genetic stock improvement of three important aquaculture species:

- genetically improved strain of BFRI silver barb, *Barbodes gonionotus*;
- BFRI GIFT *i.e.* super strain of *Oreochromis niloticus* and
- BFRI rohu, *Labeo rohita.*

This was done through several generations of genetic selection, which showed a 32 percent, 35 percent and 10 percent superiority in body weight respectively over non-selected control groups of these species.

The improved strains are presently being disseminated in a large number of public and private hatcheries. The all-male population of GIFT is in tremendous demand throughout the country.

Development of pearl culture: A total of seven freshwater mussel species namely *Lamellidens marginalis, L. corrianus,*

Scenic front view of the BFRI in Mymensingh, Bangladesh

L. phenchooganjensis, L. jenkinsianus, Parreysia corrugata, P. favidens and *Novaculina gangetica* were identified in lakes, rivers, ponds and other water bodies of the country for pearl culture. Tiny pearls have been produced in experimental ponds through mantle tissue-operated mussels.

The number of pearls depends on the inserted pieces of mantle tissues. In a single mussel, 5-20 pieces of pearl have been developed; image pearls have been formed with one thin permanent pearl layer (nacre); nuclei pearl did not show good results. The highest survival rate of about 80 percent was found in mantle tissue-operated mussel after two months among three types of operation.

Culture and fattening of mud crab: Crab fattening in now a growing aquaculture practice in coastal regions of Bangladesh. Local fisher groups including women are active in crab farming. A stocking density of 10 000 crablings/ ha ensured better production. As regards crab diet, replacing 50 percent trash fish by slaughter house waste was found effective for culture, and replacement of 75 percent for fattening. On the other hand, it was found advisable to replace 25 to 50 percent of the trash fish by shrimp heads for culture and to replace 50 percent for the sake of fattening.

Research-based technology development

BFRI has so far developed more than 40 improved aquaculture and management technologies (including a number of biotechnology techniques) aimed at increasing aquaculture production. Those found viable in the farmer's field are :

- Monosex seed production and culture of BFRI super tilapia strain;
- Mass seed production technique of climbing perch (*Anabas testudinius*);
- Mass seed production and culture of riverine catfish (*Pangasius* spp.);
- Improved nursery management of carps, catfish, tilapia and prawn;
- Polyculture of carps and prawn;
- Integrated rice-fish and floodplain fish farming;
- Fish culture in pen;
- Improved extensive culture of shrimp in enclosure;
- Crab fattening, etc.

Carps are bred in these happas

Impacts of technologies

All these technologies have been successfully transferred and disseminated to farmers and entrepreneurs in major areas of the country through training and demonstration and through distribution of extension leaflets, booklets and manuals. By adopting these technologies in suitable water bodies, farmers have contributed tremendously to aquaculture production.

The present average fish yield per unit area of water of various aquaculture practices is as follows: carp polyculture in perennial ponds 3 500 - 4 500 kg/ ha; monoculture of riverine catfish 30 000 - 40 000 kg/ ha; monosex culture of tilapia 12 000-16 000 kg/ ha; monoculture of climbing perch 8 000-10 000 kg/ ha; monoculture of silver barb 1 800-2 500 kg/ ha; integrated rice-fish culture 250-350 kg/ ha (only fish) and improved extensive shrimp culture 300-350 kg/ ha. As a result, aquaculture production has nearly doubled itself during the last 15 years.

BFRI has already fine-tuned its major aquaculture technology packages on the basis of regional need and agro-ecological suitability. The institute has been continuously extending newly evolved technologies in collaboration with the Department of Fisheries (DoF) and other GOs/ NGO partners.

It is hoped that the national objectives of food security and poverty alleviation, particularly in rural areas, will be achieved by massive transfer of these technologies all over the country with the help of GO and NGO agencies, and progressive farmers/ entrepreneurs.

The success of BFRI in generating aquaculture technologies and improved resource management practices paved the way for NGO participation in fisheries extension activities in 1988. Before that time, NGO involvement was limited to social service sectors like primary health care, child education, adult education, and family planning.

Research-Based Information Generation

The Institute attaches special importance to publication and documentation of aquaculture and management technologies for wider adoption. For this reason, extension manuals, leaflets, posters and handouts are circulated freely among government and non-government extension agencies, farmers, entrepreneurs, etc. Training manuals are also prepared on clients' demand. ***Fisheries Newsletter*** and the ***Bangladesh Journal of Fisheries Research*** are being published biannually to document the Institute's activities and research findings.

Working Linkages

The research, training and management activities of the Institute are carried out in close cooperation with various national and international organizations/ agencies and NGOs. Feedback is obtained from them.

BFRI collaborates with national universities and maintains close liaison with them for fisheries R & D. International linkages include the World Bank, the International Development Agency, the IFAD, WorldFish Center, ACIAR/ CSIRO, BOBP-IGO, NACA, DFID, and University of Stirling.

The main national collaborators are the DOF followed by Bangladesh Agricultural Research Institute (BARI), Bangladesh Rice Research Institute (BRRI), and the Department of Agricultural Extension (DAE). Joint R & D programmes are carried out with NGOs like PROSIKA, BRAC, CARE, Bachte Shikha, Jagoroni Chokra, etc.

Emerging Issues of Fisheries Development

While aquaculture has been making good progress through development of various technologies, some new issues have cropped up. These must be dealt with seriously to maintain the current growth of the aquaculture industry. Some of these issues are:

- Broodstock management and dissemination of improved fish breeds;
- Genetic stock improvement of commercially important species;
- Improvement of aquaculture practices;
- Development of quality fish feeds;
- Conservation of aquatic biodiversity;
- Introduction of alien invasive species;
- Control of infectious fish and shrimp diseases;
- Improvement of quality of aquaculture and fisheries products; value addition and trade related issues.
- Degradation of the aquatic habitat.

Harvesting of carp fingerlings for stocking

The Next Steps

In recent years, inland and marine capture fisheries all over Asia have been declining gradually because of overfishing and deterioration of the aquatic environment. Aquaculture is seen as the most promising option for filling the gap in aquatic food supply.

The available inland closed-water resources of Bangladesh offer excellent opportunities for culture of suitable fish species (both finfish and shrimp). Though aquaculture is still in its infancy, there is enormous scope to increase the present level of aquaculture production fourfold or fivefold through improved aquaculture and management technologies. Proper expansion of evolved technologies is expected to create job opportunities for one-third of the country's population.

The institute is conducting research for biodiversity conservation of threatened fish species like Pabda, Gulsha, Tengra, Koi, Shingi, Magur, Mohashol, Bheda, etc. and for popularizing the culture of small indigenous species. This will help conserve endangered fish species and increase the production of small fishes.

According to a poverty reduction strategy paper prepared by the government, BFRI's main research goal is to increase fish production threefold by the next 10 years through scientific fish farming and open water fishery management practices.

If technology transfer to the field is done right through massive extension, demonstration and training, aquaculture alone can meet half of the country's fish production by the next five years. This requires adoption of the right policy, programs and investment by all agencies concerned.

Status of Sea Safety Programmes for Small-scale and Commercial Fishermen in Myanmar

Than Oo Wai, Department of Fisheries,
Ministry of Livestock and Fisheries, Myanmar.

The Union of Myanmar has a coastline of 2 832 km on the Bay of Bengal (BoB). It shares common maritime boundaries with Bangladesh and India in the BoB and with India and Thailand in the Andaman Sea. The continental shelf covers an area of 230 000 sq km; the central and southern parts of the shelf are relatively wider than the others.

Myanmar's fisheries waters, which include a territorial sea and an Exclusive Economic Zone (EEZ), add up to 486 000 sq km. Its coastline can be divided into three coastal regions: the Rakhine coastal region, the Ayeyarwady or Gulf of Mottama region (the Delta zone) and the Tanintharyi coastal region.

The Rakhine coastal region stretches 740 km from the Naaf river to Mawdin point and covers an areas of 367 780 sq km.

The Ayeyarwady delta zone lies between Mawdin point and the Gulf of Mottama. The Ayeyarwady River, together with the Sittaung and Thanlwin rivers, enters the Andaman Sea through nine principal mouths.

The Tanintharyi coastal zone covers an area south of Mottama up to the mouth of the Pakchan River and includes the Myeik Archipelago and the Andaman Sea.

Marine living organisms depend for their sustainability on coastal mangrove and other forest resources, which serve as breeding and nursery grounds and as a source of detritus. Mangrove forests in the coastal region of Myanmar occupy some 382 00 ha. Of these, 274 795 ha are in the Ayeyarwady delta, 140 024 ha in the Taninthayi, and 64 752 ha in the Rakhine. Coral reefs are abundant in the islands of Myeik archipelago, also in the Rakhine coast.

Marine Capture Fisheries

Myanmar's marine capture fisheries can be analysed in terms of fishing effort in the in-shore and off-shore fisheries.

(a) In-shore fishery – This refers to fisheries carried out five nautical miles from the shore in Rakhine and 10 nautical miles from the shore in the Ayeyarwady and Tanintharyi coasts. The fishing is done by passive fishing gear such as gill nets, drift nets, long lines, and traps. without the use of boats.

(b) Off-shore fishery – This refers to the capture fishery being operated by active fishing gear, with fishing vessels exceeding 30 feet in overall length and 12 H P of engine power.

CHINA
INDIA
KACHIN STATE
SAGAING DIVISION
BANGLADESH
CHIN STATE
SHAN STATE
MANDALAY DIVISION
MAGWAY DIVISION
RAKHINE STATE
LAOS
KAYA STATE
BAGO DIVISION
THAILAND
AYEYARWADY DIVISION
YANGON DIVISION
KAYIN STATE
MON STATE
TANINTHARYI DIVISION
ANDAMAN SEA

The off-shore fishing grounds extend from the outer area of the demarcated in-shore fishery areas to the end of the EEZ. The main fishing gear: bottom trawl, purse seine, surrounding net, drift net, long line.

In 2000-2001, the Department of Fisheries (DoF) permitted 1 936 national fishing vessels to operate in the offshore fishery. Of these, 967 used trawls, 77 purse seiners, 778 used drift nets, and 114 used longlines. In the same year, 32 foreign fishing vessels were permitted to operate in the offshore fishery.

Fisheries Waters: The fisheries waters of Myanmar include those within the EEZ, the territorial sea, offshore, inshore waters, all inland brackish waters and fresh waters – 1989 Law, Section 2 (1).

Fisheries resources: Myanmar has a 1 800 km-long long coastline. If

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This article is based on a presentation made by Mr Than Oo Wai at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, Chennai, 1-4 February 2006.

Total biomass and MSY in Myanmar marine waters *(Million metric tonnes)*

Areas	Biomass			MSY		
	Demersal	Pelagic	Total	Demersal	Pelagic	Total
Rakhine	0.194	0.175	0.369	0.160	0.087	0.247
Delta (Yangon, Ayeyarwady, Mon)	0.334	0.505	0.839	0.220	0.252	0.472
Thanitharyi	0.256	0.295	0.551	0.170	0.147	0.317
Total	**0.784**	**0.975**	**1.759**	**0.550**	**0.486**	**1.036**

the large number of estuaries and islands are included, the total length of coastline would be close to 3 000 km. The continental shelf (0-200 meter depth) covers an area of 225 000 sq km.

With a view to identifying new fishing grounds and existing stocks and the rationale of exploitation, a Marine Fisheries Resources Survey and Exploratory Fishing Project was implemented in 1979-83 with FAO assistance. Project activities consisted of acoustic/ experimental fishing surveys with R V Dr Fridtjof Nansan and trawl surveys with a national vessel.

The surveys revealed a biomass of about 1 million metric tonne of pelagic fish and 0.8 million tonne of demersal fish in Myanmar marine fishery waters. Of this biomass, about 0.5 million tonne of pelagic fish and 0.55 million tonne of demersal fish totaling 1.04 million metric tonnes was regarded as annual maximum sustainable yield. (MSY).

Fisheries management and management measures

The DoF in the Ministry of Livestock and Fisheries is responsible for management of fisheries, conservation of resources, extension services, research, and national statistics in fisheries and fishery-related infrastructure.

Though Myanmar's marine fisheries have been growing steadily, there is scope for expanding fishing capacity to tap unutilized resources. This is confirmed by catch reports, and by statistics of landings and surveys. Management measures include licensing; stipulating the exploitable species; listing environmentally-friendly fishing gear and methods; regulation of fishing effort through closed areas and closed seasons.

To ensure sound fisheries management, the Government has promulgated four fisheries laws. Salient features relating to management are:

- Reduction of fishing mortality.
- Preservation of areas, habitats and fishing grounds.
- Protection of specific stocks and species.
- Exploitation of resources on a rational and sustainable basis.
- Curbs on industrial activity harmful to the environment.
- Enforcement of fisheries laws and regulations.

To protect juvenile fish and shrimp, and avoid conflicts between artisanal fishermen and trawlers, trawling is banned within five miles from the shoreline at the Rakhine coast, 10 miles from the shoreline in the Ayeyarwady and Taninthayi coasts. Two months, July and August, constitute a closed season.

Artisanal fishermen account for a major portion of the marine catch. It is therefore essential to meet their needs by increasing their incomes, strengthening their livelihoods and improving their environment. The system of zoning in fishing is meant to protect local fisheries. The DoF gives first priority to local fishermen by permitting them to operate in all zones. Besides, waters between the baseline and the coast, as declared in the Territorial Sea and Maritime Zone Law, are reserved entirely for local fishermen.

The sharp increase in demand for quality marine products has fuelled the exploitation of shrimp and other demersal resources. This has led to resource use conflicts, sometimes violent, between trawlers and small-scale fishermen. To ensure more equitable exploitation and to support the sustainability of small-scale artisanal fisheries, the DoF has sought to limit the size and engine power of fishing boats in inshore areas. The DoF also determines the type of fishery, volume of business by fishing method, the species of fish that can be exploited, size of fish, fishing implements and fishing grounds. All fishing licences stipulate conditions on these points.

The DoF has laid down figures for minimum mesh size and the minimum catchable size for the main fish species. Examples: the mesh size on fish trawl cod ends should not be less than 2.5 inches and 2 inches for shrimp trawl cod ends. The minimum mesh size

Number of inshore fishing vessels in Myanmar (2001-2004)

State & Division	2001-2002			2002-2003			2003-2004		
	Power	Non-Power	Total	Power	Non-Power	Total	Power	Non-Power	Total
Tanintharyi	8 731	2 102	10 833	9 364	1 746	11 110	8 382	2 394	10 776
Ayeyarwady	350	2 414	2 764	977	3 010	3 987	641	1 882	2 523
Yangon	70	-	70	70	-	70	70	-	70
Mon	1 847	19	1 866	2 046	15	2 061	1 844	41	1 885
Rakhine	2 593	10 114	12 707	3 150	10 042	13 192	2 727	11 880	14 607
Total	13 591	14 649	28 240	15 607	14 813	30 420	13 664	16 197	29 861

Number of offshore fishing vessels in Myanmar (1999-2004)

State/ Division	2001-2002	2002-2003	2003-2004
Yangon	478	756	714
Rakhine	48	85	24
Ayeyarwady	574	786	737
Mon	227	267	246
Tanintharyi	402	415	400
Total	**1 999**	**2 309**	**2 121**

should be 8 inches for large- mesh drift nets and 3.5 inches for small-mesh drift nets.

Socio-Economics

Myanmar has some 2 646 710 active marine fishermen – both full-time and part-time. Some of them also engage in fish processing, marketing and mending of fishing gear. Fishing being a seasonal occupation lasting just a few months, fishermen also take up other occupations such as farming.

Most fishing vessels are owned not by fishermen but by petty businessmen, who appropriate a major share of the catch. The financial status of fishing communities is unknown. Baseline information is now being collected, to improve understanding of the traditional fisheries system.

Policy and Objectives

The principal objectives of the fisheries sector are:

- To promote all-round development in livestock and fisheries.
- To increase fish production for domestic consumption and share the surplus with neighboring countries.
- To encourage the expansion of marine and freshwater aquaculture.
- To improve the socio-economic status of the fisher community.

Ensuring sea safety

A fishing boat registration system has been introduced at specific checkpoints to provide information about fishing boats lost or damaged at sea. Government radio stations broadcast weather reports. But the system for ensuring safety at sea is inadequate. Nearly all artisanal fishermen live in remote areas. They lack the means, the education and the awareness for safe practices. They do not use life jackets or life rafts – they depend on home-made contrivances such as plastic containers and drums. If they fall ill, they resort to home remedies and indigenous medicines; the organised medical system is expensive. They can't afford radio equipment on their boats. Further, radio telecommunication for small-scale fishing boats is not well developed in Myanmar. It is therefore up to the Myanmar Navy to help fishermen at sea in distress.

Small-scale fishermen urgently need training on the precautionary approach to minimize accidents at sea. They need to upgrade their knowledge of fishing technology. Coordination and cooperation on these issues are needed with international and regional organizations.

Marine Fisheries Production (2000 to 2004)

Unit: Thousand Metric Tonnes

Year	Marine Fisheries Production
2000-2001	949.67
2001-2002	1029.46
2002-2003	1053.72
2003-2004	1132.34

Fishing communities in tsunami-affected area

The main tsunami-affected area in Myanmar is the Pyinsalu sub-township, Laputta Township (Myaung Mya District, Ayeyarwaddy Division). In seven villages in the main area of Laputta Township, 25 people were killed, while 289 homes and 123 fishing boats were destroyed. At Kawthaung, Tanintharyi division in the southern part of Myanmar and in Rakhine State, in the western part of Myanmar, some people were killed; some homes and fishing boats were destroyed.

Preventive measures

The DoF believes that the following prevention measures are necessary against the tsunami.

1. Mangrove conservation should be promoted to set up natural barriers against the tsunami.
2. Buildings should be constructed off the shoaling space. Tsunami-resistant features should be incorporated in them.
3. People living on the sea shore areas should be educated about the tsunami.
4. Transport facilities should be available to quickly move people and materials to safe areas.
5. Food, water and medicines should be provided to victims of the tsunami. Other relief works should be undertaken.
6. A tsunami early warning system should be set up. A regimen for emergency evacuation to safe areas should be rehearsed in every region.

New Initiatives on Sea Safety to Help Small-scale Fisherfolk Communities

There's good news for small-scale fisherfolk communities – in the Bay of Bengal region and elsewhere.

A safety-at-sea project will come up in Chennai from May 2007. It will be housed in the office of the BOBP-IGO and will cover small-scale fisherfolk communities in Bangladesh, India, Sri Lanka and Maldives. A similar project will come up in West Africa.

Both projects will be part of a US $10 million five-year FAO global programme on Safety at Sea for Small-scale Fisheries in Developing Countries, headquartered in Rome, with funds from Sweden.

The global programme aims at better and safer livelihoods for small-scale fishing communities globally. It will analyse information, raise awareness, adopt strategies, and formulate project proposals on safety at sea.

Why such a project?

Fishing at sea is perhaps the most dangerous occupation in the world. Loss of life at sea has devastating consequences on dependents. Widows have low social standing. With no welfare system to help them, they and their dependents face destitution.

In South Asia, and in developing countries in general, safety standards for small vessels lag far behind those for larger vessels and industrial fisheries. Accident reporting is unsatisfactory. The IMO has recommended that statistical information on casualties, including fishing vessels and fishermen, should be collected and analysed annually. But few developing countries are able to supply this type of data.

Capacities and capabilities for ensuring safety at sea in the small-scale fisheries sector are lacking in many developing countries. So is knowledge and awareness among government officials, fishers and communities on safety at sea procedures and equipment. Networks and institutional arrangements for dealing with safety-at-sea issues are inadequate.

The new project will seek to address these problems in co-operation with a Global Coordination Unit of the FAO Global Programme.

Recommendations from Chennai Declaration

In South Asia, the project will build on the work of the BOBP and the BOBP-IGO – particularly on recommendations from the **Chennai Declaration** and the **IFISH 3 Conference**. It will

- Provide and analyse data to identify the causes of accidents.
- Educate and train trainers, extensionists, fishermen and inspectors.
- Elaborate on improved fisheries management measures and safety regulations and enforcement of these regulations.
- Apply FAO draft guidelines for construction and repair of small FRP fishing vessels.
- Repair and upgrade vessels constructed for tsunami rehabilitation that are of poor quality, using FAO draft guidelines.

The project will liaise closely with projects concerned with tsunami rehabilitation and reconstruction.

The BOBP/ FAO Regional Workshop on Sea Safety for Artisanal and Small-scale Fishermen was held in Chennai, from 8th to 12th October 2001. It was attended by government officials from seven countries, representatives of Fisheries and Maritime Administrations, the Coast Guard/ Navy and representatives of fishermen's associations.

The Chennai Declaration, adopted at the end of the workshop, suggested a Regional Program on Sea Safety for Artisanal and Small-Scale Fishermen, which could formulate a holistic long-term approach to improve safety at sea for small-scale fishermen. Necessary measures would include analysis of accident data; education and training of trainers, extension workers, fishermen and inspectors; better fisheries management and enforcement; stronger collaboration between fishermen, fishermen's organisations and governments.

IFISH 3 and after

On the basis of this suggestion, BOBP-IGO designed a programme for promoting safety at sea. As part of this programme, the third IFISH (International Fishing Industry Safety and Health Conference) was convened on 1-4 February 2006 by BOBP-IGO, FAO and the National Institute for Occupational Safety Health (NIOSH), USA in Chennai, one of its themes being "Enhancing the Safety of Fishermen in Small-scale Fisheries".

IFISH-3 placed special emphasis on issues confronting small-scale fishermen. It gave participants from developing countries a unique opportunity to interact with experts on fishing industry safety and health.

The workshop made a number of recommendations on safety at sea for small fishing vessels. They related particularly to collection and analysis of data from sea accidents and rules and regulations for safety and communication equipment and vessel construction.

The IFISH 3 conference included a special workshop to review rehabilitation efforts following the 26 December 2004 tsunami. The workshop pointed out that many small fishing vessels constructed with the assistance of NGOs after the tsunami were of low quality, often dangerous for fishing operations, and exposed the fishermen to high risks.

Expected Outputs of the South Asia Project

- An improved system in place for reporting and analyzing accidents involving small scale fishers.
- Rules and regulations for safety and communication equipment and vessel construction developed and introduced.
- Increased collaboration between fishermen, fishers' organisations and government.

NIOSH to assist in occupational safety and health of coastal communities in India

NIOSH (National Institute for Occupational Safety and Health), USA, is to provide technical and other assistance to the BOBP-IGO for two pilot projects – strengthening sea safety, and improving the conditions of salt workers. This was revealed in April 2007 in Chennai by Dr George Conway, Chief of the Alaska Field Station and Director, Agriculture, Forestry and Fishery Program, NIOSH.

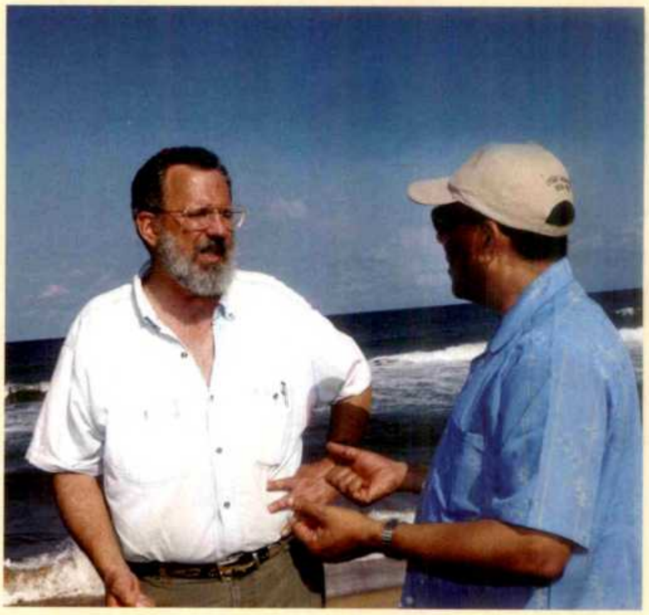
Dr Conway and Dr Y S Yadava met fishermen and visited boatyards in Tuticorin and Mahabalipuram. They also visited saltpans and met salt workers in Tuticorin and in the Sambar salt works of Rajasthan.

Strengthening sea safety: "Data collection and analysis are essential to strengthen sea safety," Dr Conway said. Data on accidents and on safety practices in small-scale fisheries may be obtained from several sources - insurance agencies, Coast Guard records, fishermen's associations, Focus group discussions. NIOSH would provide technical assistance with data collection methods and statistical analysis. This technical activity will be conducted in collaboration with the Fishing Technology Service (FIIT) of the FAO's Fisheries and Aquaculture Department.

Post-tsunami relief work in India had led to a deluge of boats, many of them in fibreglass, a material some boatbuilders are not familiar with. Many of the boats were deficient in quality and failed to meet construction standards, and this affected the safety of fishermen. "We will look at what can be done to improve safety standards," said Dr Conway.

In response to a question, Dr Conway said that the SIDA-funded FAO project on sea safety is much larger in scope and size than NIOSH's assistance. "Our inputs will be supplementary and complementary, and relatively modest."

Improving the conditions of salt workers: The BOBP-IGO has highlighted the plight of salt workers in India through a one-year study completed recently. (See "The saga of India's salt workers" in the March 2006 BBN). The health and safety of the salt workers are crucial problem areas. Says Dr Conway, "The salt industry in India has no parallel. India is by far the biggest producer of salt by manual and evaporative means of production. The salt industry in the U S and in Europe, by comparison, is highly mechanised."



"We have received a request for assistance to salt workers from the Salt Commissioner through the BOBP-IGO. In response, we are assisting the BOBP-IGO in preparing a plan for the health and safety of salt workers. This is a tremendous opportunity to help a rather large work force working under often quite basic conditions.

"Our goal will be to work with BOBP-IGO, the Salt Commissioner, the salt industry and its workers, to make tangible improvements in the condition of salt workers," says Dr Conway.

Digitising Photographs — the BOBP-IGO Experience

Since its inception, the BOBP has recognised the vibrant and compelling role of photography in not merely documenting but promoting and catalyzing development. Photo exhibitions in Chennai and Colombo (1980 and 1981) were the first major photo activities of the BOBP. Just about all of the BOBP's professional staff were prolific camera-persons - though very often, enthusiasm for photography far surpassed talent!

Over the years, BOBP and later its successor the BOBP-IGO, built up a formidable collection of several thousand photographs - both slides and color negatives. These vividly capture both small-scale fisherfolk communities and the work of the BOBP in Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. The collection was painstakingly catalogued and indexed with the help of a staff documentalist. More than a dozen slide shows were organised. These were prime attractions at the Advisory Committee meetings of the BOBP and the Governing Council Meetings of the BOBP-IGO.

But prints and negatives deteriorate with time. The BOBP-IGO decided to digitize the photo collection to preserve it. About 1 500 negative folders containing some 22 200 photographs have so far been scanned and stored in electronic format. An equal number of photographs still remain to be digitized. Our photo wealth - earlier visible through slides and prints and negatives taking up several shelves in the library - is now invisible, compressed into DVDs. Once completed, the BOBP-IGO's digital photo library could perhaps be one of the richest photographic resources on small-scale fisheries in the world.

VIEW FROM THIS SIDE
VIEW FROM THIS SIDE

Technologies come and go, but photography continues to drive impact in BOBP-IGO's information and documentation effort.

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation(BOBP-IGO). The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

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Code of Conduct for Responsible Fisheries

Taking it far and wide

Feedback from fishers - and reflections from the Bay of Bengal News - on 12 years of the Code of Conduct for Responsible Fisheries, the most important international instrument ever devised for development and management of fisheries.

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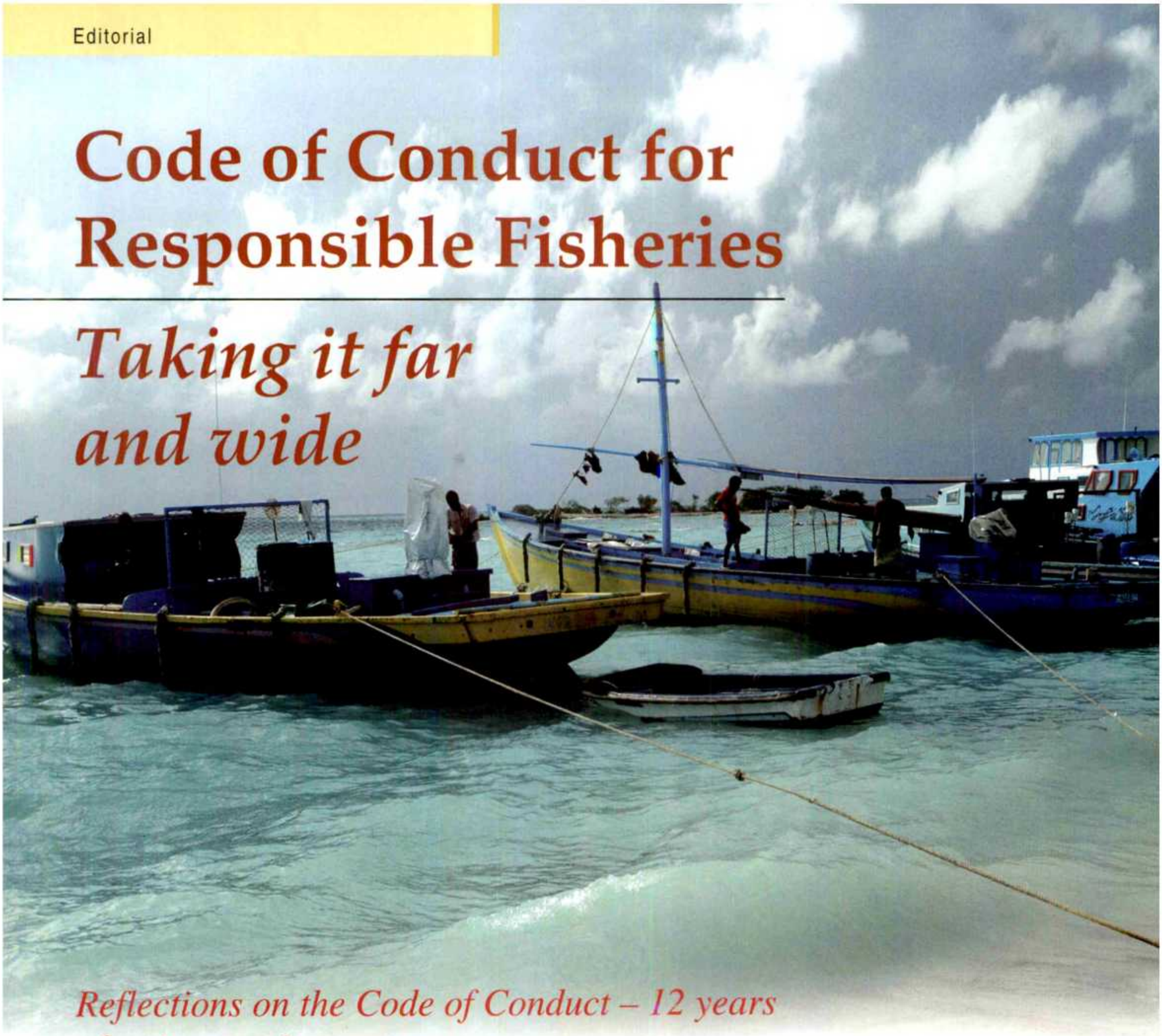
Code of Conduct for Responsible Fisheries

Taking it far and wide



Reflections on the Code of Conduct – 12 years after its creation.

In October 2007, the Code of Conduct for Responsible Fisheries (CCRF) will be 12 years old. It's time for an objective assessment of its impact.

How well-known or widely known is the Code? How do we adapt it to meet regional and national requirements? How do we take it to the grassroots, where it matters most? How do we ensure and monitor compliance with its principles and practices – by governments, by fisherfolk?

Most fisheries officials perhaps know about something called the Code of Conduct for Responsible Fisheries. But its penetration to the grassroots has been dismal. In some places, copies of the Code and its technical guidelines have been made available in the vernacular. But there has been little effort to promote or catalyse debate and discussion among fisher communities about the meaning of the Code and its technical guidelines and their implementation.

The Code is a set of principles, conventions and standards relating to various aspects of fisheries. Here is an assortment of comments, criticisms and insights relating to implementation of the Code.

Improve information about the Code, and disseminate it better

Simple print literature is perhaps the first step in documenting the Code. The short and simplified version of the Code brought out by the FAO was excellent in this context, and helped awareness-raising among fisheries officials and scientists.

Vernacular translations of the Code are essential. BOBP has helped translate the Code into several Indian languages, also into Sinhala, Divehi and Bangla. However, more innovative and interactive tools of communication need to be tapped to make an impact on fisherfolk. Examples: comics, street plays, beach meetings, video films, posters, pamphlets (which could even be distributed at public places in coastal areas such as bus stands and cinema halls). Plus radio programmes for fishers out at sea.

The FAO has created a special window through FISHCODE to assist member-countries to implement the Code and its Technical Guidelines. Greater support for FISHCODE would strengthen FAO's hands for implementation of the CCRF.

At the local level, frequent brainstorming workshops with fishers – at district headquarters and fishing villages – would lead to better understanding of fishers' problems and possible solutions.

Catch 'em young

At the one-day consultation with fishers of Tamil Nadu (pages 24-28), it was suggested that the Code of Conduct should be made a part of the school curriculum.

A special syllabus or a supplementary school programme could be considered for coastal areas, with a focus on fisheries. The fundamentals of conservation, management and responsible fisheries could be taught in an interesting way. This is already being done in the Maldives, and its experience could be of interest to other countries in the region and elsewhere in similar settings.

Fisheries educational institutions in the region ought to be mobilized to improve awareness of the Code of Conduct. CCRF could be a subject of specialization. A core of specialists on the subject would enable a build-up of knowledge and expertise.

Ensure political support for implementation

There may be no political opposition to the Code and its implementation. But the Code – like fisheries itself — may suffer from malign neglect, from low priority. It is up to fishers, fisher bodies and fisheries departments to lobby support from decision-makers on the Code, and on ways to operationalise it.

Responsible fisheries isn't attained by a Code alone

Codes and conventions cannot on their own lead to responsible fisheries.

A fisheries regime that is fair and equitable to all will prevent illwill and strife among different stakeholders, and replace confrontation by co-operation. This means a whole set of policies and actions to address the concerns of fishers and improve livelihoods.

At the one-day consultation with fishers, fishers said the most important messages they picked up from the Code related, in order of priority, were fisheries management, fishing operations, post-harvest technology, education and training, sea safety, communication and conservation. This is revealing.

Resource education, conservation and management

Fishers are aware of the dangers of overfishing. But they need education and orientation on resource depletion trends and patterns, on fish behaviour, on management methods and tools.

This means mobilizing resource specialists and fishery scientists in a concerted campaign to educate fishers – a matter for governments and international agencies to consider.

Every department of fisheries needs a resource management wing. A uniform ban on fishing during monsoon months needs to be introduced. Resource enhancement programmes such as artificial reefs and ranching, should be promoted and popularized.

The subsidiarity principle, which takes management to the lowest management level to encourage participation, should be encouraged.

Model legislation on the Code should be introduced after careful study on aspects of the CCRF that are appropriate for the purpose.

Fishing capacity should be systematically monitored to ensure sustainability. Ensuring the co-operation of fishing communities in this task would be a great help. The practice of multi-agency registration of fishing vessels should be ended.

Community-based fisheries management (CBFM) is the most effective management strategy, since the fishers themselves take vigorous part in management, even initiate it, and monitor it. However, CBFM cannot materialize overnight. Co-management – the practice of government working together with fisherfolk to manage the resource – is a useful first step.

BOBP-IGO has been involved, along with the International Co-operative Alliance, in promoting community-based fishery resource management in Asian countries. Funded by Japan, the project brings experts to an Asian country; select fishers and fishery officials from that country do a study tour of Japan. A workshop is then held in the Asian country. Philippines was the focus of this project during 2006-07. The project's experiences and findings are of interest to CBFM and co-management in all countries of the region.

Plug those information gaps

The connection between development and data (or information) is obvious, but a strong disconnect between the two characterizes fisheries in most developing countries. Gaps in fisheries data should be plugged, to enable better analysis and decision-making. Involving fishers in data collection may lead to more reliable data.

Rationalise governance

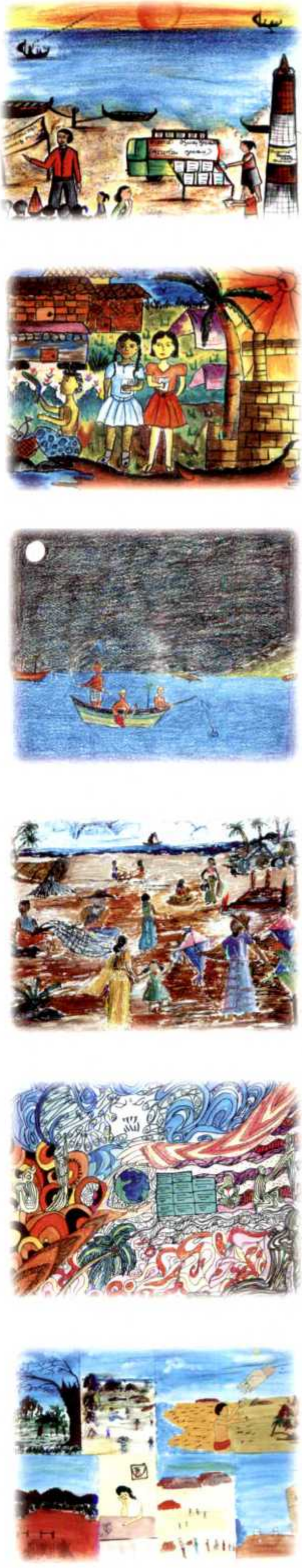
The point has been made many times in many contexts, but bears repetition. All fisheries matters in India, now scattered among a slew of Ministries and departments, need to be brought under a single administrative umbrella. Likewise, fisheries administration in other countries too, needs rationalization.

Institution-strengthening and capacity-building in fisheries, essential by themselves, would also help strengthen implementation of the CCRF. This is an ongoing and long-term process. Governments in the region must study needs in this area and methods to bring it about, with perhaps assistance from the FAO and international agencies.

In 2005, the FAO's Committee on Fisheries (COFI) at its 26th session, called for a "decade of implementation" for international fisheries instruments. A special year of implementation for the CCRF may help accelerate awareness, compliance and problem-shooting.

The Code of Conduct took many years, marathon effort, formidable expertise and substantial resources to develop. It deserves substantial effort now to further the purpose for which it was created. All stakeholders need to join in this effort, for the benefit of fishers and fisheries, and for humankind as a whole.

– Y S Yadava



Paintings by school children in India, Maldives and Sri Lanka depicting post-tsunami reconstruction.

Governing Council of BOBP-IGO Meets in Malé, Reviews Work

Third Meeting of the
Governing Council
BOBP
2 - 3 May 2007, Malé, Maldives

Delegates to the Governing Council meeting.

The Governing Council of the BOBP-IGO held its third meeting (GCM) on 2-3 May, 2007, in Malé, Maldives. Representatives of the four member-countries (Bangladesh, India, Maldives, Sri Lanka) took part.

The Hon'ble Abdullah Jihaadh, Minister of State, Ministry of Finance and Treasury, Republic of Maldives, chaired the inaugural session. Three other Ministers also took part – Dr (Ms) Fathin Hameed, Deputy Minister, Fisheries and Marine Resources, Ministry of Fisheries, Agriculture and Marine Resources, Mr Mohamed Zuhair, Deputy Minister, Ministry of Fisheries, Agriculture and Marine Resources, and Ms Dunya Maumoon, Deputy Minister of Foreign Affairs.

Welcoming delegates, Dr Y S Yadava, Director, BOBP-IGO, urged member-countries to develop collective action to meet the growing challenges of marine resources management and safeguard the livelihoods of millions of small-scale fishers in countries around the Bay of Bengal (BoB). He said that the BOBP-IGO is fast metamorphosing into a full-fledged regional fishery body; the Governing Council has a special role in accelerating this progress.

Mr Zuhair referred to damage caused by the December 2004 tsunami. He said that technical advice and expertise provided through the BOBP-IGO would help the government to streamline its policies for future development of fisheries.

Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources, Sri Lanka, and Chairman of the Governing Council, complimented the BOBP-IGO on the excellent work done in a short time, and stressed the need for regional co-operation in fisheries management, essential in view of the trans-boundary nature of fish and marine resources.

In his inaugural address, Mr Abdullah Jihaadh, Minister of State for Finance and Treasury, Maldives, said that modern-day fisheries management is a multidisciplinary affair with international and regional implications. Since coastal fisheries are complex, multi-gear and multi-species in nature, participatory and community-based approaches should be promoted. He hoped that the GCM would find common concepts based on regional initiatives and experiences.

The third GCM unanimously selected the representative of Maldives as chairperson.

Presenting the BOBP-IGO's report for Jan 2006-March 2007, Dr Yadava said that much of the effort during the year related to post-tsunami rehabilitation, safety at sea of small-scale fishers and community participation in marine resources management. The IGO has taken initiatives with international partners to promote safety at sea.

The Maldives delegate said that coastal fisheries in the Maldives are unique because of the coral reefs. In recent years, there has been considerable pressure on reef resources, and this warranted serious interventions. He suggested that master fishermen and crew needed training in multi-day fishing. Maldives would like to see more collaboration with BOBP-IGO in this context.

Responding to a suggestion made by Sri Lanka, the Secretariat said that technical support for strengthening of fisheries cooperatives in Sri Lanka and for sea-safety of small-scale fishers would be taken up during the year. The sea safety project is a FAO-SIDA initiative in the member - countries.

India informed the GCM about a census of marine fisherfolk conducted recently, which would enable various planning activities concerning small-scale fisheries. India also enquired about the status of work on marine resources management models, assessment of the marine fishing fleet and ornamental fisheries. The BOBP-IGO Secretariat responded that work on resource management models for selected species would be initiated in 2007. This would involve management plans for Hilsa fisheries (of Bangladesh, India and possibly Myanmar) and for shark (India, Maldives and Sri Lanka).

The delegate from Maldives said that his country's national management plans for sharks and groupers and marine ornamental fisheries could serve as resource material for developing the regional management plan on sharks and for finalising the report on the status of ornamental fisheries in India.

On assessment of the fishing fleet, the Secretariat said that this work would be taken up by a proposed regional workshop on monitoring, control and surveillance scheduled during the current year. Data collection on the status of ornamental fisheries in India was complete and a report would be initiated soon.

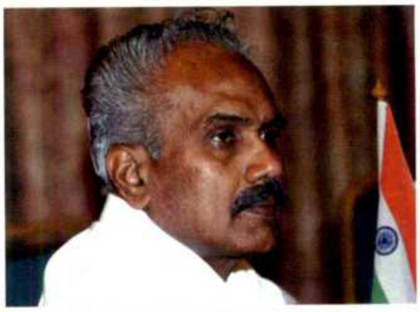
Following a comment from Bangladesh about the importance of shrimp aquaculture and the shortage of shrimp post-larvae, the delegate from Sri Lanka said that aquaculture contributed 95 percent of the shrimp production in his country. However, shrimp farming in Sri Lanka has been affected by viral disease, resulting in a recurrent loss of crop. To reduce this problem, the National Aquaculture Development Authority of Sri Lanka has developed a crop management plan, which could perhaps help other shrimp farming countries in the region.

The Director of BOBP-IGO pointed out that since aquaculture-related activities are part of the mandate of the Network of Aquaculture Centers in Asia-Pacific (NACA), it may not be desirable for BOBP-IGO to take

The Governing Council meeting in progress (above and below).

Third Meeting of the
Governing Council
BOBP
2 - 3 May 2007, Male, Maldives

Mr Syed Ataur Rahman (Bangladesh)



Mr G D Chandrapal (India)

Dr Abdulla Naseer (Maldives)

Mr G Piyasena (Sri Lanka)

up this discipline. The Governing Council resolved that the BOBP-IGO should undertake work on preparing a shrimp broodstock management plan in co-operation with NACA.

The Governing Council complimented the BOBP-IGO on the several activities undertaken by an organisation of its modest size. Maldives said that translation of the Code of Conduct for Responsible Fisheries (CCRF) documents in local languages would help member-countries to create awareness among fishers about their responsibility towards marine resource management. This will further help in reform of fisheries policy, which Maldives has recently undertaken.

Bangladesh suggested that in future meetings of the Governing Council, the Secretariat should present a matrix of work endorsed by the Governing Council at its earlier meeting and the activities actually carried out by the Secretariat during the period of reporting.

Report on the Second Technical Advisory Committee (TAC) Meeting

The Secretariat presented the Report on the second meeting of the TAC held at Chennai, India on 5-6 February 2007.

A detailed overview was presented of some of the programme priorities and thrust areas agreed to by the TAC. It included

- Development of regional management plans for important fisheries such as hilsa and sharks;
- Capacity-building for implementation of MCS programmes; and
- Information dissemination and networking to assess and strengthen as necessary, the present networking capacity in BOBP-IGO member-countries.

The Governing Council discussed the role of the TAC and how it can more effectively assist BOBP-IGO in implementing its programme of work. Responding to a query from Bangladesh, the Secretariat said that the TAC (set up under Article 11 of the Agreement on the Institutionalisation of the BOBP as an Inter-Governmental Organisation) advises the Governing Council. The Council recommended that the Secretariat should present a thorough assessment of the TAC's mandate and functions to the next GCM. It further suggested issue-specific meetings between the Governing Council and the TAC.

About the proposed Regional Workshop on MCS in Bangladesh, the Governing Council advised the Secretariat to present a formal request to the Government of Bangladesh.

The Governing Council accepted the report of the second TAC meeting, subject to the comments above.

Proposed Programmes and Priorities for BOBP-IGO for 2007

Salient features of the proposed programme and priorities of the BOBP-IGO for May - December 2007:

(I) Capacity-Building and Information Services for Fisheries Development and Management in the Bay of Bengal Region.

- Translation and printing in national languages of the FAO-CCRF Technical Guidelines on Marine Fisheries. Plus circulation of printed copies to concerned institutions/ agencies/ fishermen associations, etc.
- Setting up of a regional information network to strengthen national capabilities in development and management of coastal fisheries. The network will provide information for development, planning, research and training.
- Training programme for junior and middle-level fisheries staff of member-countries on implementation of the CCRF. The training will be conducted in collaboration with the Central Institute of Fisheries Education, Mumbai, India.
- Organisation of a fisherfolk week to promote and institutionalise a participatory and community-based system of management of fisheries and aquatic resources. The fisherfolk week will educate, sensitise and influence public opinion, in particular stakeholder opinion, on responsible behaviour in resource management and conservation.
- Information dissemination through the ***Bay of Bengal News*** and other publications. Reports of activities completed during the period will also be published and disseminated.

(II) Fisheries Resource Management

- Organisation of a regional workshop on Monitoring, Control and Surveillance.
- Preparation of regional management plans for hilsa and shark fishery.

In response to a query from Bangladesh, the Secretariat said that activities relating to awareness-creation could be supported during the fisherfolk week, besides logistics for organising a programme. The Governing Council suggested that information materials produced by the BOBP-IGO on awareness-creation could cover both inland and marine fisheries, as fisherfolk in most member-countries belong to both areas.

About the training programme for junior and middle-level fisheries staff on implementation of the Code of Conduct, the Governing Council suggested that intake of staff from each member-country should be increased to four from the proposed two.

Responding to another query from Bangladesh, the Secretariat said that issues related to food safety in marine fisheries would be addressed in a limited manner in the proposed fisheries management plans for hilsa and shark fisheries. But the Governing Council felt that the BOBP-IGO should include this aspect in its work programme during 2007, in view of rising global concerns on the quality of fish.

The Governing Council suggested the following programmes and priorities for BOBP-IGO in 2007:

(i) Capacity-building and information services for fisheries development and management in the BoB region.

(ii) Fisheries resource management.

(iii) Capacity-building for improving food safety in marine fisheries.

The Governing Council decided that

- Bangladesh's suggestion for a programme on alternative income generation for small-scale fishers in member-countries should be reviewed and submitted to the Third Meeting of the TAC, and also to the next GCM.
- The BOBP-IGO's activities should be linked with funding available from member-countries, also with funds for specific activities from other sources. It cautioned that some activities might be limited in scope and size because of lack of resources.
- To optimize the efforts of the BOBP-IGO, focal points should be established in each member-country and liaison officers designated to deal with BOBP-IGO activities.

Administrative Matters

- The Auditors' report for 2003 and 2004: Bangladesh suggested that auditing should be more rigorous, including reporting on the performance side too. Sri Lanka remarked that the present audit report was fully in line with audits generally conducted for UN agencies and IGOs. The GCM suggested that a fresh list of auditors be presented to the next GCM. The list should be drawn up after a press advertisement.
- The GCM unanimously agreed to the reappointment of Dr Yugraj Singh Yadava as director of BOBP-IGO for a second term of three years starting from 01 October 2007, on existing terms and conditions. The GCM felt this was essential to maintain the present momentum of the organization. The terms of reference proposed for the post of Senior Programme Advisor were also approved. The Secretariat was urged to circulate information about this vacancy widely.
- Secondment of technical personnel from member-countries to the BOBP-IGO Secretariat for 12 to 18 months – this was agreed to in principle. The Secretariat was asked to provide a detailed proposal to member-countries outlining disciplines, emoluments and other terms and conditions.
- The proposal for a 'living allowance' for staff recruited from India: This was agreed to in principle, but most delegates felt that the proposal did not provide enough details on the increased cost of living. The Secretariat was asked to prepare a detailed proposal for the next GCM.

Other matters

- Tuna fisheries. Some member-countries have started harvesting tuna in significant quantities. Maldives and Sri Lanka suggested that a right forum should be identified to discuss matters relating to tuna fishing, marketing and trade. Recommendations should be made about such a forum at the next GCM.
- Agenda papers for the GCM should be circulated sufficiently in advance.
- The third GCM deeply appreciated the generous hospitality for the meeting provided by Maldives. Bangladesh's kind offer to host the next meeting early in 2008, subject to its government's approval, was accepted.

Marine Research Centre, Maldives

Marine Research Centre, Malé, Maldives

Marine fisheries is one of the cornerstones of the Maldivian economy. From the earliest times, this small entity of coral islands (atolls) has thrived as a source of food, trade, livelihood and culture. Once known only for a traditional subsistence-based pole and line tuna fishery, Maldives today has a number of commercial fisheries and state-of-the-art processing units. The sector is a major source of jobs, and employs about 11 percent of the country's labor force. Nearly one-fifth of the total population depends on fisheries for incomes.

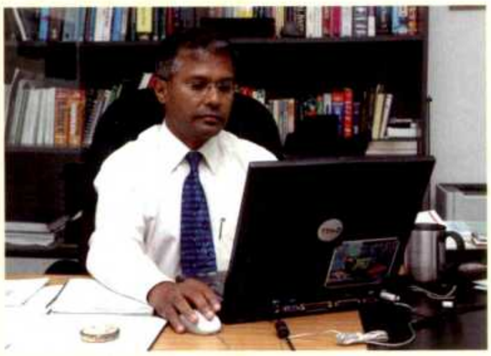
The Marine Research Centre (MRC) of Maldives was founded in 1984 as a research arm of the Ministry of Fisheries, Agriculture and Marine Resources (MoFAMR). Its mandate: to undertake research on living marine resources and to provide scientific advice on marine resource management and on the state of the marine environment. Initially it was known as the Marine Research Section (MRS) of the Ministry of Fisheries and Agriculture. In 1998, it became a semi-autonomous Government institution.

During the first couple of years, the MRS carried out resource assessments and taxonomic studies on fin and shellfish species. The University of New Castle-upon-Tyne provided the main technical assistance. Funds were provided by the UK's Overseas Development Authority, now known as DFID (for studies on coral reef degradation); by the ICOD of Canada (for reef fisheries identification and cataloguing); by FAO/ UNDP (for fisheries resource surveys); and by CSIRO of Australia.

The MRC assists the government, the industry and the public in decision-making on rational utilization of the country's marine resources. It also raises awareness on the marine environment through knowledge dissemination.

The MRC is mandated by the President to:

- Plan, coordinate and conduct scientific research on marine resources of the country.
- Undertake marine research directed at the conservation, enhancement and management of the marine environment in general and fisheries exploitation in particular.
- Publish research findings and reference materials and disseminate knowledge to promote public awareness about fisheries and the marine environment.
- Study ways and means to increase the fisheries sector's contribution to the national economy.
- Conduct resource surveys in selected areas within the country.
- Compile and implement a database containing data as well as scientific information on marine resources.
- Undertake research on technological innovations to promote the rational utilisation of marine resources, and introduce these technologies to the fishing industry.
- Undertake research on the rational utilisation of reefs and reef resources.



Dr M Shiham Adam has a BSc (Hons) in Marine Biology from the University of Newcastle-upon-Tyne (UK), an MSc in Fisheries Biology and Management from the University College of North Wales (Bangor, UK), and a Ph D in Fisheries Management from the Imperial College, London. He was a post-doctoral research fellow at the University of Hawaii at Manoa from 2000 to 2003. He then returned to Maldives and took up the position of Director of Fisheries Research at the Marine Research Centre. He was promoted as Executive Director in September 2005.

Dr Adam's research specialty includes spatial management, and the movement and migration of large pelagic species. He takes active part in the international tuna tagging program being undertaken by the Indian Ocean Tuna Commission (IOTC). He is also a member of the steering committee for the International GLOBEC program CLIOTOP (Climate Impacts on Top Ocean Predators).

Organisational Set-up

The MRC is located at Malé, capital of Maldives. It comprises four divisions dedicated to marine fisheries, coral reefs, aquaculture, and education and awareness. At the headquarters, the focus is on tuna research. MRC has a network of 13 field offices that continuously collect and collate data on the biological aspects of tuna and bait fisheries. Reviews are conducted every year for policy making. Coral reef research was initiated under the National Coral Reef Management Programme. The MRC has established 25 coral reef monitoring sites in the country from which data is collected twice a year to observe the growth and health of coral reefs.

The main activity of the Education Awareness Unit is to maintain the library and the museum. The library is extensively used and is armed with wireless local area networks (WiFi) ports and the Agora or hybrid library management system (HLMS). Presently, the library houses some 900 electronic journals related to marine fisheries science. Along with the library, the MRC headquarters attracts visitors to its museum which focuses on the marine resources of the Maldives and the evolution of its marine fishing fleet from small artisanal boats to large modern mechanised vessels.

Besides the headquarters, MRC has a research station located at Bodumohoraa Island in Vaavu atoll. The island is uninhabited. The station has a permanent staff strength of 17, including the research station manager. It presently is active with grouper and pearl culture. The station houses stocks of grouper spawners – they have been held for the last 18 months in an on-shore facility. A grouper hatchery is also located on-shore. Pearl culture was initiated in 1999 to promote alternative livelihood options under the second phase of the UNDP-assisted project. The species farmed is *Pteria penguin;* efforts are on to totally close the life cycle. The objective of the programme is to set up a model raft system and collect biological information. The project is now being extended to Baa Atoll.

WHALE AND DOLPHIN STRANDINGS

The Museum at the Marine Research Centre (above and below).

Machanised masdhoni

The MRC has three vessels, mostly used by field staff. One is a 65-footer, another is a 15-footer equipped with an OBM, the third is a 15-foot whaler. The MRC is now constructing a 85 ft. research vessel at an estimated cost of Rf. 4 million (0.36 million USD), for research in the sea. It will carry 14 researchers on board. Expected to be operational by mid-2008.

Ongoing research activities

The MRC's research work at present relates to coral reefs, aquaculture and fisheries. Under coral reef management, MRC has undertaken ecosystem analysis and monitoring, habitat monitoring, coral recruitment studies and economic valuation of coral bleaching impacts on tourism. On aquaculture, the organisation has undertaken aquatic animal health and feed management, aquaculture technology development and aquaculture program support service activities. Fisheries research comprises research on reef and pelagic fisheries.

Coral reef research programme

A formal coral reef monitoring program was first implemented by MRC with assistance from the International Centre for Ocean Development (ICOD), Canada, in 1990. Since then reefs have been monitored for natural and anthropogenic impacts on an ad-hoc basis. The Centre, jointly with the

The library of the Marine Research Centre, Maldives.

University of Newcastle-upon-Tyne, is exploring the possibility of rehabilitating degraded reefs (as a result of coral mining) through the use of artificial reef structures of varying complexity. In particular, the project seeks to establish whether mobile rubble — which is characteristic of mined reefs – can be stabilised by artificial reef structures, and whether these structures can recreate the ecological conditions necessary to re-establish fish and coral populations on the reef flat. The programme is funded by the UK's Overseas Development Administration.

To manage the diverse reef system of the Maldives, MRC has initiated a GIS research programme to study and characterize reef types in Maldives by examining their geomorphologies through satellite images. The objective is to generate GIS-based resource and habitat maps that can be used for both environmental and reef resources management. Landsat 7 ETM+ satellite images are being used for this research.

MRC is the key institution responsible for implementing national and regional programs for the Global Coral Reef Monitoring Network (GCRMN), South Asia (http://ioc.unesco.org/gcrmn/index.html). National reef monitoring efforts have been complemented and strengthened through integration with GCRMN from 1997.

The major coral bleaching event of 1998 in the Indian Ocean coincided with the commencement of GCRMN activities in Maldives. Carefully selected monitoring sites were established countrywide to understand the recovery of reefs in the aftermath of coral bleaching. Under a rigorous and standardized training scheme, biophysical changes in reefs and in the socio-economic conditions of user communities, have been monitored regularly during the past five years.

Coral reef resource mapping, quantification and reef growth patterns

Coral reefs are the mainstay of the Maldivian economy. Despite this high reliance on reefs, knowledge about the extent of reefs and their areas in individual atolls is slight. MRC is trying to bridge this knowledge gap by quantifying reef habitats and their resources using satellite and airborne imagery.

Coral reef area and size, sea grass beds, mangroves, reef lagoons, reef islands and other reef habitats are being accurately mapped and quantified so as to generate better estimates of resource inventories. The organisation has also undertaken research on probing the relationships between lateral reef growth and monsoon-generated hydrodynamic regimes. Understanding such relationships is critical to assess how reefs will respond to rising seas and altered weather patterns because of global warming.

Coral Reef Degradation in the Indian Ocean (CORDIO)

CORDIO (www.cordio.org) is a program created in response to degradation of coral reefs throughout the Indian Ocean by the extensive coral bleaching and mass mortality of corals that occurred in 1998. MRC is the focal point for coordinating and implementing CORDIO activities in Maldives. CORDIO focuses on understanding the ecological and socio-economic effects of coral reef degradation in the Indian Ocean region.

Fisheries Research

A healthy bait fishery is a prerequisite for tuna pole-and-line fishing in the Maldives. MRC has carried out studies, with some local funding, on quantifying the bait usage and seasonal availability of bait. The MRC is at present studying the use of light at night to attract baitfish. An experimental FAD (fish aggregating device) deployed in an atoll lagoon -- rigged with timer-switches and lights to improve night bait fishing — has been shown to be effective in increasing the bait supply. MRC is currently evaluating the economic feasibility of this technique. It is also studying by-catch issues and the potential for interaction with the traditional method of bait catch.

A major impediment to bait-fishery research is the lack of means to regularly monitor the fishery at the national level. There is no provision to record information on bait catch in the established national tuna catch effort recording system. An effective mechanism to gather baitfish catch/ effort data on a routine or regular basis is urgently needed to help management.

Grouper fisheries

Commercial exploitation of grouper for live export started in 1993. During 2001, more than 350 000 groupers were exported, the value being nearly US$ 4 million. An assessment of the fishery and holding facilities was carried out in 1994; it included recommendations to develop and manage the fishery. Some of those management recommendations, including registration of holding facilities and improved collection of catch statistics, have been implemented.

Oceanic Resource Evaluation & Assessment

The most recent reviews of the fishery were conducted in 1998. These covered all the major species in the fishery: Skipjack tuna *(Katsuwonus pelamis)*, yellow fin tuna *(Thunnus albacares)*, frigate tuna *(Auxis thazard)* and Kawakawa *(Euthynnus affinis)*. Topics considered included CPUE trend analyses in relation to oceanography – fishery interaction, basic biology and ecology of the species.

The MRC has also conducted two very successful tagging programmes. The first was conducted during 1990-1991 and assisted by the former Indo-Pacific Tuna Management Programme (IPTP). The second was carried out during 1994-1995 under the IDA/ World Bank Third Fisheries Project's Technical Assistance component. The main aims of the tagging programs were to determine the movements of skipjack and yellow fin tuna within and outside the Maldives, to investigate fishery interactions, and to estimate growth rates of skipjack and yellow fin tuna. Analyses of the tagging programs data appear in various reports, conference papers and peer-reviewed journal papers.

MRC conducts regular sampling of the Malé Fish Market, the major fish-landing site in the Maldives. Sampling parameters include size and weight measurements of major tuna varieties (skipjack, yellow fin, bigeye, kawakawa and frigate tuna). MRC also helps to maintain and improve the quality of the tuna catch / effort data collection by training regional field officers and by providing technical expertise to the statistics section of MoFAMR.

The MRC maintains records of sightings of cetaceans (whales and dolphins) and has an on-going stranding recording programme. MRC has been maintaining records of cetacean stranding since its formation. Special recording forms have now been distributed to every inhabited island. The MRC has also participated in several cetacean survey cruises and supported the Maldives stages of the round-the-world cetacean research conducted during the Voyage of the Odyssey (www.whale.org).

Impact factor

Along with its paternal organisation MoFAMR, the MRC has close ties with the Environmental Research Centre under the Ministry of Environment, Energy and Water, and the Ministry of Atolls, for carrying out activities in the islands and in the Educational Development Centre. The MRC is a household name in the Maldives through radio and TV programmes. More importantly, the Centre is known to fishers as a trusted knowledge and technical service provider.

Fisheries science in the country is taught in all schools at the secondary level. The MRC has contributed substantially to the development of textbook materials for schools. The MRC library serves as a one-stop resource for students for their school projects. The Code of Conduct for Responsible Fisheries is not included in the textbook, but the word 'conservation' is used frequently, it also appears in the Maldivian lexicon as ***Zimaadaaru Masverikan***. What's important now is to promote and internalise the Code of Conduct. The MRC is also well-positioned to give advance warnings on sustainable fisheries and on the environmental impact of global warming and other phenomena.

Major achievements

The MRC catalogue on Maldivian fisheries is a significant achievement. It changed the thinking of Maldivian fishers. The monitoring and analysis of coral reefs is another important achievement. The MRC's work has raised public awareness on the importance of reef conservation and given the government research inputs for policy formulation. Setting up a field station for grouper and pearl research is another major achievement. The field station can contribute significantly to mariculture and alternative livelihoods.

The next step

Having established itself in the Maldives, the MRC should now seek to become a leading institute in the region for research, advocacy, scientific and academic thinking. The MRC is therefore strengthening its human capital base and gearing up to take on more collaborative programmes on coral reef ecosystems. It is also planning to set up a microbiology and fish pathology laboratory at the Aquaculture Centre. However, the MRC is constrained by lack of funds. At present, the Government of Maldives finances the MRC. But stronger participation by donor agencies is needed to help MRC achieve its objectives.

The MRC is one of the constituents of the Technical Advisory Committee of the BOBP-IGO. The interaction is mutually beneficial. The Centre hopes to get wider exposure for its work through the IGO. It also expects BOBP-IGO to facilitate exchange of information among research entities in the Bay of Bengal region and to strengthen the MRC's education and awareness programmes.

Evolving India's Strategies for the Global Debate on Fisheries Subsidies

Samar K Datta and **Rahul Nilakantan**

Edited and abridged from a paper presented at a Development Economics Symposium organized by the University of Southern California, Los Angeles, June 23-25, 2005.

Though the WTO was set up in 1995 to discipline trade-distorting actions by member-countries, fisheries subsidies escaped the WTO discipline. But during the Doha Ministerial Conference (held in November 2001), members decided to open up the subject for debate. International agencies like FAO and UNEP, and some important countries, have raised mainly two types of issues.

a) Should the regular WTO Agreement on Subsidies and Countervailing Measures (ASCM) be applied to fisheries? Should the discussion on fisheries subsidies limit itself to direct and indirect government financial transfer (the legal definition of subsidies provided by ASCM)?

Or should it also include "implicit subsidies" – which cover benefits to fishers through government actions such as research & development, and regulation? Should the discussion cover government inaction in failing to enforce measures to prevent water pollution, loss of bio-diversity, etc?

b) Another issue relates to non-transparency on subsidy issues and non-availability of data and information across countries (and hence the incomparability of data).

This paper contends that the open-access nature of fisheries is mainly responsible for overfishing and over-capacity, the main problem that plagues marine fisheries today; subsidies merely exacerbate the problem.

The paper says that the authorities should address the question of property rights in fisheries and remove institutional hindrances to a property rights system. Merely focusing on subsidies won't do.

The paper says that international organizations like FAO, OECD, APEC and UNEP have been preparing for some time for WTO discussions on subsidies.

A large country like India will be required to come up with a policy response to the irreversible process of liberalization and globalization in fisheries. This paper is meant to help the process and provide a perspective on the issue.

The paper suggests strategies for domestic reform in India, as well as for its international negotiation strategies. Together, these will ensure the long-term sustainability of fisheries (ecological, social and commercial viability), the authors say. These strategies are based on the authors' interaction with major stakeholders in Indian fisheries and on selected case studies from across 10 Indian states; also on a closer examination of India's submissions to the WTO.

What follows is an edited and abridged version of some sections of the paper.

Issues arising out of the debate

A. Subsidies or property rights – what is the principal cause of marine fisheries' problems?

The "Open Access" nature of most of the world's marine fisheries is generally cited as one of the two major causes of overcapitalization of the fishing industry, and therefore

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of over-fishing (the other cause being the massive state subsidies to the fishing industry). Subsidies bring down the total cost of production, encouraging further exploitation of the resource.

Overcapacity is inevitable in an open access fishery – subsidies merely exacerbate the problem.

Obviously, the problem of overcapitalization can't be resolved satisfactorily without limiting entry into marine fisheries and in most cases providing some property rights — or more precisely, exclusive use rights to producers. Ending the open access nature of the fishery would mean that producers would no longer be competing for a share of the resource, but would have an incentive to practice more responsible fishing.

A few countries – notably New Zealand, Australia, Canada, and Iceland – have introduced Individual Tradable Quotas (ITQs) into some of their fisheries.

Do some fisheries subsidies contribute to fishing fleet over-capacity?

Natural resource subsidies are classified into three following broad categories (Porter, 1998):

(i) ***Direct subsidies*** : These are given through direct government financial transfers, which are expressed in the budgetary outlays.

(ii) ***Indirect subsidies*** : These subsidies are provided through control of trade in certain natural resource sectors like forests, water and agriculture.

(iii) ***Implicit subsidies*** due to government inaction or inadequate action.

This third form of natural resource subsidy occurs when, for example, a government permits private businesses to remove a natural resource from the public domain at little or no cost to the producer. Result: the government lets private companies rather than the government or the public to benefit from rent on natural resources.

The efficient allocation of natural resources requires that their prices should account for three distinct components of cost: (i) the direct cost of extraction/ harvesting the resource (ii) the cost of benefits foregone by society by consuming the resource rather than leaving it for future consumption, and (iii) the cost of any environmental externality associated with its extraction and use.

Failure to apply the "User Pays Principle" leads to prices that do not reflect the full social costs of the natural resource, thus creating room for potentially serious market distortions and environmental effects.

Can well-managed fisheries avoid or minimize the problem of over-fishing, even if the fishing fleets are subsidized?

In theory, the answer to this question is yes, but ground realties militate against the pinning of hopes on 'well-managed' fisheries. Porter (2002) argues that very few fisheries management systems have demonstrated the ability to keep catches below levels that put pressure on the stocks. "It would be unwise to base international policy towards the fisheries subsidies regime on the theoretical proposition that well-managed fisheries can neutralize the negative impacts of subsidies."

Do some fisheries subsidies contribute to reducing overcapacity?

This question assumes importance because it deals with one of the largest categories of financial support to the marine fishing industry. In theory subsidies to reduce capacity, say by retiring vessels, licenses or fishermen, could lead to capacity reduction, but the ground realities and experiences of many major fishing nations indicate otherwise. These programs face difficulties in achieving their targets specifically in fisheries where the "overall incentive structure encourages the race for fish (Porter, 2002)."

The problem of subsidies therefore has also to be tackled simultaneously with the issue of property rights in marine fisheries for a permanent solution to the problems of marine fisheries.

Trade versus environment

The current debate on fisheries subsidies seems to downplay the trade- distorting effect of these subsidies and over-emphasize their environmental effects. Given that the environmental concerns are serious in that the world's marine fisheries are in a state of crisis, this should not deflect attention from two important facts (i) the global trade in fish and fish products is heavily distorted; (ii) not all marine fisheries are over-fished, with some fisheries in developing countries actually under-exploited.

How to handle the problem of fisheries subsidies?

Porter (1998) suggests that the international community can handle the problem of fisheries subsidies in one of three broad ways: (i) It can negotiate a protocol on fisheries subsidies within the framework of an existing multilateral environmental agreement like the Convention on Biological Diversity (CBD) or the Convention on Straddling Fish Stocks and Highly Migratory Fish Stocks; (ii) It can negotiate a new stand-alone agreement on fisheries subsidies or on the broader question of fishing overcapacity; and (iii) It can deal with the issue within the framework of the global trade regime referred to as the ASCM.

What are the broad issues for India?

The broad issues that face India in the context of the debate on fisheries subsidies can be summed up as follows:

1. Can we take care of our fisheries concerns within the ASCM framework for subsidies, with minor modifications on account of the sector-specific characteristics of fisheries?
2. If the global debate over fisheries subsidies goes beyond the earlier ASCM framework for direct and indirect financial transfers, and encompasses government services, government inaction or inadequate action, can India redefine, recast or even modify fisheries subsidies and convert this challenge into opportunity to set the domestic fisheries management system in order?
3. At the same time, can India lead natural-resource-rich developing countries in protecting the interests of their fisherfolk? (*e.g.*, by highlighting anomalies in fisheries sector property rights between developed and developing countries?)
4. India has entered into a number of international agreements and conventions to preserve biodiversity and the environment and to follow responsible fisheries practices. Can India use this opportunity to operationalize some of these agreements and conventions?
5. Can India use this opportunity to link subsidies to the global competitiveness (in terms of both price and quality) of her fisheries products using the tools of domestic resource cost ratio and property rights? This will sensitize

Category III and IV Subsidies

Category	Subsidy Type	Effects on Industry Profit	Some examples of such subsidies
III	Government non-financial interventions and regulations	Possible negative effects in the short-term, but positive effects on industry profit in the long run.	• Hatchery and fish habitat programs • Environmental regulations • Enhancement of the fisheries community environment • Technology transfers • Protection of marine areas • Gear regulations (*e.g.* TEDs) • Food safety and hygiene regulations • Environment protection programs, chemical and drugs regulations • Production and feed quota schemes in aquaculture • License requirements for fish farming • Veterinary surveillance requirements for aquaculture
IV	Government inaction, inadequate action or inappropriate action	Allows producers to impose in the short run or the long run certain costs of production on others – this includes the environment and natural resources. This has an effect on industry profits.	• Free access to fishing grounds • Lack of pollution control • Lack of management measures • Non-implementation of existing regulations • Free or below market price resource access • Lack of implementation of fish quality standards • Fisheries registration fees not collected • Non-enforcement of existing regulations • No requirement of certificate of competence or fisherman's license • Use of free public services, *e.g.* water, sewerage services, for fishers, etc.

Source: Adapted from Westlund (2002).

stakeholders, especially commercial enterprises engaged in processing and exports.

Fisheries subsidies –reporting mechanisms and subsidy figures

The WTO mandates members to notify all subsidy programs (as defined by the WTO, which follows the ASCM definition of a subsidy). But the WTO register records fewer subsidies than APEC and OECD studies.

There are two reasons. (1) The WTO follows a narrow definition of a subsidy, defined by the ASCM, whereas OECD and APEC follow broader definitions. (2) Even programs that meet ASCM criteria for a subsidy are not being reported to the WTO. In fact, Schorr and Cripps (2001) estimated that WTO members were reporting fewer than 10 percent of their fishing subsidies.

The WTO reporting mechanism for fisheries subsidies is thus like a leaky colander – it allows much more to escape than it retains! In fact, the only thing that is certain about the official numbers for fisheries subsidies is that they are grossly inadequate – they capture at best a small fraction of the subsidies actually conferred.

For all countries, there is a large difference in subsidization as per the ASCM and FAO definitions. In several cases, countries reported no subsidies under the ASCM definition, but sometimes large amounts of subsidies under the FAO definition. For developing countries, subsidies as per the FAO definition exceeded ASCM-defined subsidies by $924.7 million. For developed countries, the comparable figure was $5 886.0 million.

Towards an operational framework to address FAO Category III and Category IV subsidies

The FAO definition of a subsidy explicitly recognizes the effects on industry profits of 'Government non-financial interventions and regulations' and 'Government inaction or inadequate action'.

International strategies for negotiations

Problem	Strategy
Failure to address property rights problems and focus only on subsidies will not solve problems that afflict marine fisheries. It will only result only in harsh curbs on subsidies	Continuously highlight importance of property rights. Urge greater emphasis on research into allocation of property rights over open seas.
"Traffic light" approach to subsidy discipline will allow travesty of "Green Box" to continue	Oppose Green/Blue Box category of exempt fisheries subsidies, based on faulty assumptions of market structure — especially in the light of subsidies meant to reduce over-capacity which have failed.
Unequal structural features of countries may be perpetuated by AMS style cap	Argue for adoption of comprehensive FAO definition to bring out unequal structural features. Go for tradable permits to prevent lock-in effects.
Linking of trade and environment issues will make trade even less free and fair, given tendency of developed countries to use NTBs like TEDs.	Argue against bad theory of using one instrument (subsidy) to address two policy objectives (trade and environment). Devote energies to creating a new policy instrument for environmental issues that is delinked from trade.
Concern that climate of debate will not permit stock-specific characteristics from moderating disciplines	Many of the world's marine fisheries are still under-exploited e.g. India's. So disciplines must take into account the status of stock exploitation.
Concern regarding conspiracy of silence on aquaculture - important for much of the developing world	India has substantial interest in inland fisheries both for nutritional security and trade. Must be more transparent on subsidies given to inland fisheries.
Definition of fisheries subsidy must be theoretically superior and all inclusive to address all sectoral problems / distortions	Argue for adoption of FAO's most comprehensive definition - work towards operationalizing categories III and IV to overcome opposition to definition
Poor quality of subsidy notifications and lack of transparency which rewards the guilty and penalizes the innocent.	India should lead by example by offering a comprehensive list of all domestic subsidies offered to morally induce data flow from other countries

The box on pre-page shows these categories of subsidies, their possible effects on industry profits and how they arise.

IV. India's strategies for domestic reform & international negotiations

A. Domestic strategies:

On the domestic front, India's fisheries sector is unfortunately a victim to large-scale negative implicit subsidies on account of inaction and inadequate action by various authorities. These reduce the already meager support the sector receives. The sector is rife with property rights problems, making it difficult for the Coasian value maximization process to continue unhindered.

B. International strategies

On the international front, India has to actively ensure that its special interests on account of the peculiar stylized features of its fisheries are not compromised. Box above highlights some problems and strategies for India to address those problems.

If these points are addressed in a holistic manner, taking care to follow all the principles of Coasian value maximization, they can usher in an era of prosperity for a country blessed with a vast fisheries resource, but an incomplete and obsolete property rights framework.

Revisiting Mahabalipuram: The challenge of restoring livelihoods

Some 18 months ago, BOBP-IGO and its partners organized a workshop in Mahabalipuram on reviving fisheries and rehabilitating fishing communities after the tsunami. (See ***Bay of Bengal News***, Vol. IV No. 7) The workshop followed an international conference on health and safety in the fishing industry.

During the workshop, fisherman P Vasu from Mamallapuram village presented a graphic picture of the tsunami's havoc. He said members of his community needed help to rebuild their assets, restore their health and livelihoods and revive their psyche. Dr George A Conway, Chief, Alaska Field Station of NIOSH, and other expert delegates to IFISH-3 then visited the village.

The expert team observed the damage wrought by the tsunami as well as the reconstruction effort. They were struck by the poor quality of post-tsunami boats in the village, which revealed basic design flaws, says Dr M Paramasivam, BOBP consultant. ("Scantling rules were ignored, skin thickness was inadequate, deck construction was weak. Further, the boatbuilders handled strong chemicals, paints and glue without taking proper precautions.")

In April this year, Dr Conway, Dr Y S Yadava of BOBP-IGO and others re-visited Mamallapuram village and spent a day with the community there to find out how they were faring.

Some basic facts about the village. It has a population of 639, who live

Meetings with officials at GRT Temple Bay (right top and middle) and the Mahabalipuram fisher community (right).

in 149 houses. There are 219 full-time fishers and 19 part-timers. Some 350 fishers are members of the fisheries co-operative society. They use 90 motorized boats and 70 non-motorized boats.

The fishing village receives some assistance from the five-star hotel adjacent to it. Manager Shabin Sarvotham of the GRT Temple Bay said the hotel has provided the village with fencing and toilets; it has given the fishers jobs; it has hired fishers to take the hotel inmates out on pleasure trips.

The visiting team met the Mamallapuram residents and panchayat heads at the local community hall. "We have to come to see and listen and understand," said Dr Conway and Dr Yadava.

What are the community's needs? The fishers said they needed cell phones and GPS (geographical positioning system) tools. They wanted their FRP boats repaired. Bath and toilet facilities in the village, and the underground drainage system, badly needed improvement and repair.

Dr Conway inspecting the damaged FRP boat.

The fishers talked about their livelihoods – fishing practices and seasons, landings, income and expenditure. They wanted training in fishing technology, in repair and maintenance of outboard engines, in preparing value-added products, in FRP boat maintenance. Also tailoring training for the women. They wanted better marketing and net-making facilities, and a restaurant that would serve refreshments. Dr Yadava assured the fishers that their requests and information on their needs would be conveyed to the authorities concerned.

On behalf of BOBP-IGO, Dr Yadava presented the community leaders with equipment to help women fish vendors of the village – several sets of ice boxes, weighing balances, aluminium containers and buckets. He requested feedback on the use of the equipment.

Dr Conway told the community that a programme on 'Augmenting Occupational Safety and Health of Coastal Communities in India' would soon be initiated and implemented through BOBP-IGO. Mamallapuram would be covered by the project; the BOBP-IGO would therefore visit the village frequently to discuss their livelihoods and welfare. The fishers welcomed the news and thanked Dr Conway and Dr Yadava, who then went round the village and inspected the boats on the beach.

There's further good news. An FAO- executed IMO-funded project on FRP boats will soon start functioning under the BOBP umbrella at Chennai. It will provide advice and organize training on FRP boat design, maintenance and repair. With the FRP boom in the region – particularly in India and Sri Lanka – the project is timely.

What happens when boats are defective

Just a few days before Dr Conway and Dr Yadava visited Mamallapuram, four fishers of the village almost lost their lives, because of a defective FRP boat. Here's the story of Karunakaran (38), Hari (38), Raghu (35), and Kumaran (30) in their own words.

"We had an FRP boat given to us by Christ India Austria, an NGO. We were not happy with the boat, it had vacant compartments in the deck. But we had to earn our bread, we had to make a living.

"On that day of March, we set out to fish at 3 a.m. We were fishing at a place about 18 km from the shore, and about 18 fathoms deep. To our horror, our boat started leaking, and water started gushing out. We used our raiments to plug the leak but that didn't work.

"The boat sank. So did our hearts, we thought that was the end. But we decided to be brave, we encouraged each other, we managed to keep afloat. To our great good fortune, some other fishers from our village noticed us, rowed toward us and took us aboard. Saved!

"We managed to locate the sunken boat and tow it ashore. We were exhausted when we reached ashore. We were taken to hospital, we had to spend Rs 8 000 on medical expenses, we also spent Rs 6 000 to repair the boat and engine. That took a whole month, and we couldn't fish. But we worked as labourers in other boats to at least earn Rs 50 to Rs 100 per day.

"An experience we won't forget."

Promoting Safety at Sea

Naval architect Revanoor Ravikumar, who has been associated with the BOBP for a long time in varied capacities, has now joined the FAO to promote safety at sea in the Bay of Bengal region.

He is the Regional Project Coordinator for South Asia for the project "Safety at Sea for Small-Scale Fisheries in Developing Countries" (GCP/GLO/158/SWE). It is based at the BOBP-IGO office in Chennai. He'll work closely with the IGO in implementing the project in Bangladesh, India, Maldives and Sri Lanka.

Ravikumar graduated in naval architecture from IIT Kharagpur. Soon after graduation, he worked for a while in England with Water Craft, specialists in FRP boats; then with Gladstone Lyall & Co (who set up India's first FRP boatyard in 1971) for constructing shrimp trawlers in Mangalore; he helped set up Aquamarine, another FRP boatbuilder, in 1975 in Chennai.

His first assignment for the FAO was as a consultant in the late '70s to a UNDP-funded Pelagic Fisheries Project, based in Cochin. Ravi assisted the project by designing an FRP purse seine vessel and installing a prototype chilled seawater system in a carrier boat for small pelagic fish.

Ravi joined the BOBP in 1979 soon after its inception. He helped develop beachlanding craft for India's east coast, and designed the fiberglass IND-20 used in Andhra Pradesh and Orissa. He trained boatbuilders of Andhra Pradesh and Orissa in FRP boat construction.

While with the BOBP, he coordinated a series of IMO-funded projects on 'Cleaner Fisheries Harbours' in India, Thailand, Sri Lanka and the Maldives.

He was also Programme Manager ***ad interim*** for the Third Phase of BOBP that dealt with fisheries management. He was associated with computerization of BOBP's accounts.

The Safety at Sea Project:

"Safety at Sea" is an often neglected facet of fishery management in South Asia, particularly in the small-scale fisheries sector. More often than not, it is due to a combination of inadequate awareness of its importance; lack of safety guidelines for fishing craft and methods; poor distress-response in terms of both strategies and infrastructure; and lack of enforceable rules and regulations.

FAO has designed a Global Safety at Sea Programme, aimed at improving the livelihood of small-scale fishing communities by decreasing the number of accidents at sea and the effects of such accidents. The SIDA-funded Project for South Asia is a component of that Programme.

Proposed activities of this South Asia project are:

- Awareness-building to promote a safety-at-sea culture within the fishing community and other stakeholders;
- Education and training of trainers, extension workers and fisherfolk to understand sea safety requirements;
- Introduction of FAO/IMO/ILO draft guidelines for design and construction and equipment of small FRP fishing vessels in a manner easily understood by the small-scale boat building industry;
- Support to the elaboration of proposals for including and implementing safety regulations as part of fishery management measures;
- Review of reporting systems for accidents-at-sea and design of an appropriate reporting and analysis procedure for implementation by appropriate authorities;
- Promote gender and HIV/AIDS awareness raising campaigns in connection with safety-at-sea awareness campaigns;
- Promote adequate representation of women and youth in the safety-at-sea work ethic.

The Project will be implemented in the BOBP-IGO member-countries. To start with, activities concerning awareness building on the need for a safety-at-sea culture within the small-scale fishing communities of the region will be implemented.

Maldives

Photo Essay by S Jayaraj

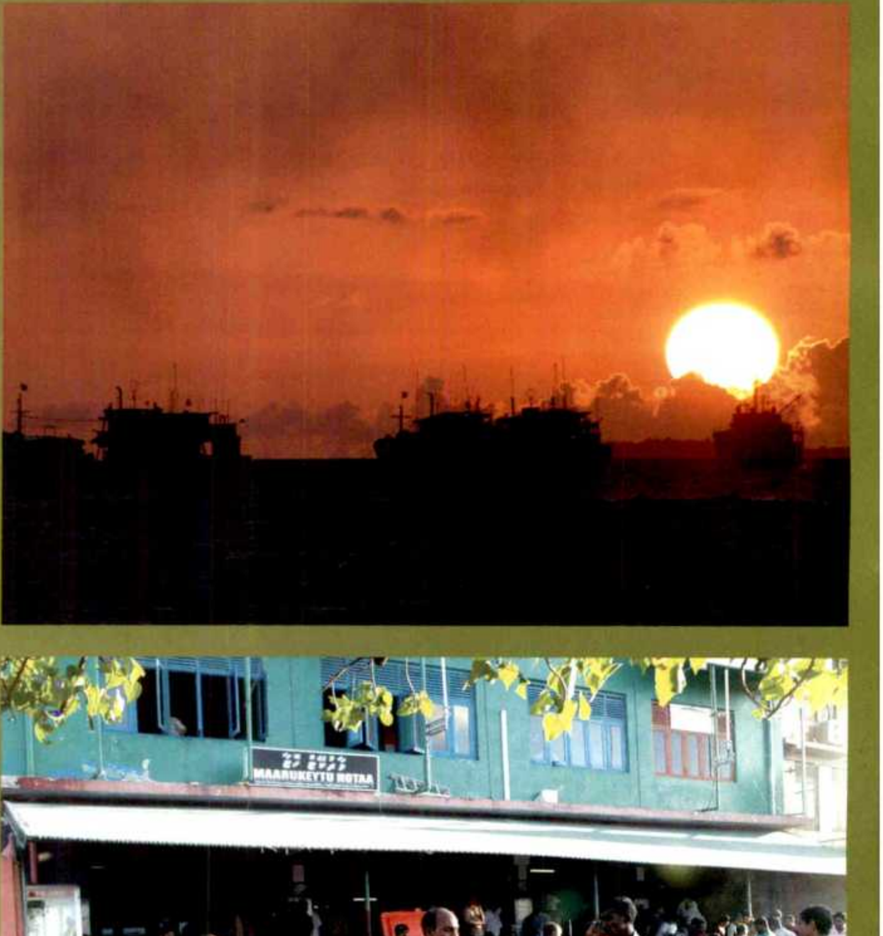
Focus on larger boats, stronger management

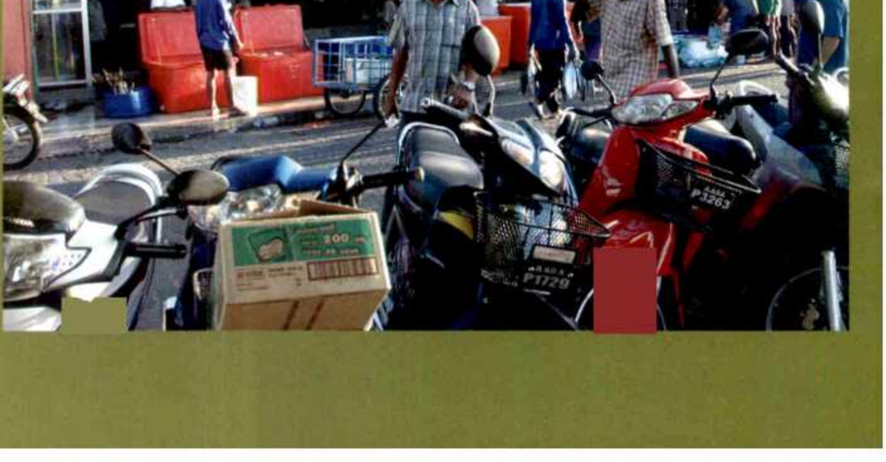
"Maldivian fishers are a lucky lot," a visitor once said. "They just have to drop a line and they get some fish. No wonder they seem relaxed and cheerful."

During a recent visit to the Maldives archipelago (1 200 coral islands grouped into 19 widely dispersed atolls), Jayaraj visited a few islands of North Malé atoll on a speedboat. Accompanied by two staff of the Marine Research Centre, Maldives, and BOBP-IGO's Rajdeep Mukherjee, Jayaraj visited Himmafushi, Thuladhoo, Gaafaru, Gulhi and Guraidhoo islands.

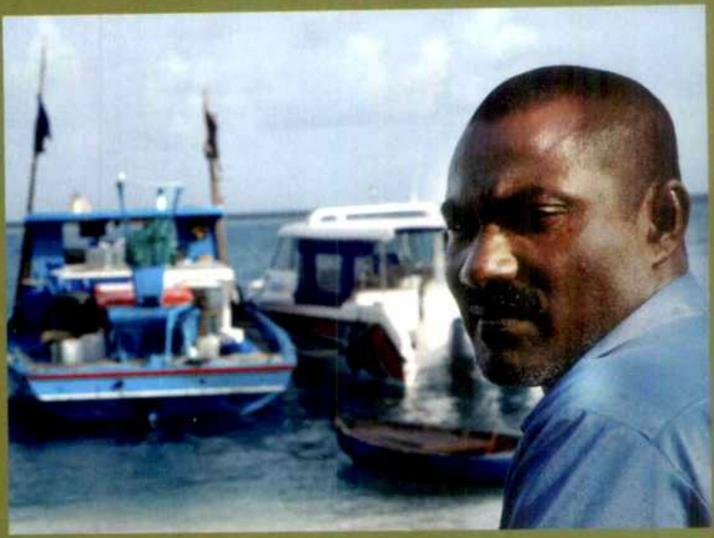
Marine resources are the country's main natural endowment; there are no inland fisheries in Maldives. Fishing operations take place in off-shore, coastal and reef waters. The economy depends heavily on fishing (tuna is the mainstay; skipjack is the main species, yellowfin is also important) and tourism (Chinese, Japanese and Germans are the most visible). Fisheries accounts for about 11 percent of the GDP, 20 percent of the jobs and 74 percent of the country's exports. In fact, more than half the catch is exported – mainly to the European Union, Sri Lanka and Southeast Asian countries.

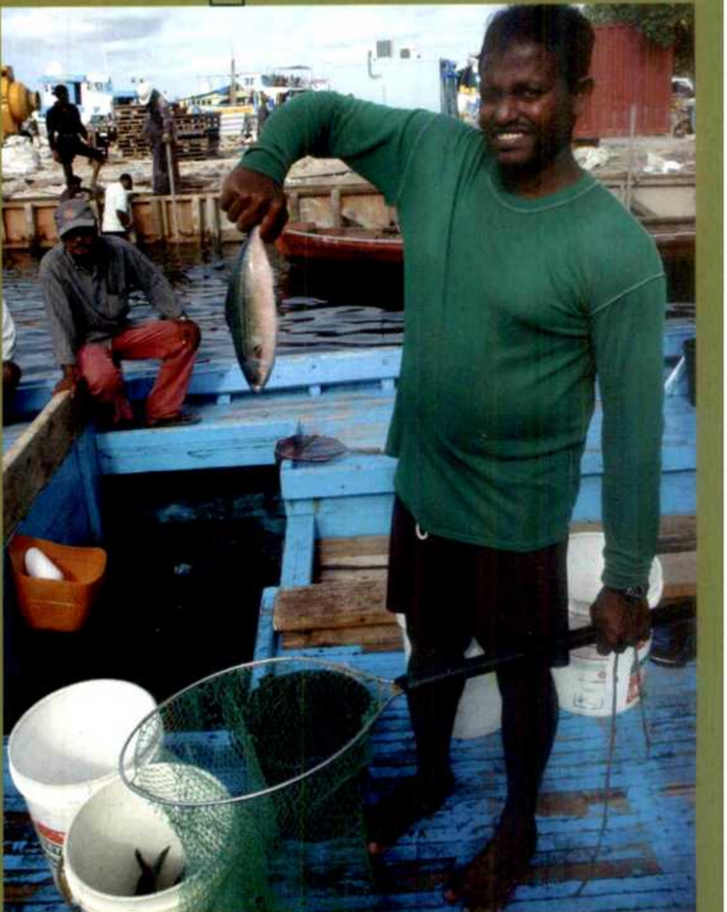
High-value reef fish, mainly grouper, are much in demand among tourists, these are often supplied to tourist resorts by fisher associations. Groupers are also being exported to China, Hong Kong and Taiwan. As tourists and exports go up, grouper stocks dwindle. "We have to spend more time than before to catch the same quantity," fishers say. Normally solitary fish, groupers tend to gather in "spawning congregations" during full moon, between September and November, and are therefore vulnerable.





Right: Scenic view and sunrise at Malé, Maldives; fish market at Malé. Opposite page: Fishing trips, landing center at Thulusdhoo and reef fish catches at Malé.





The Ministry of Fisheries, Agriculture and Marine Resources (MoFAMR) is promoting a management campaign for grouper, through posters, etc.

The Ministry is concerned about possible over-exploitation of reef fish and of the need for management in general (even baitfish are going down in numbers, tropical aquarium fish, bêche-de-mer and giant clam are also under pressure). It is studying the possibility of co-management and wishes to introduce a system in the Maldives that is practical and effective. But time will be needed for awareness-raising on co-management and for mobilizing the co-operation of all concerned. A stakeholder consultation on the subject was held early this year. A quota system based on monthly average landings is mooted by some. "Daily quotas will be difficult to enforce," some officials say.

Dhonis and masdhonis, in various versions, make up the bulk of the fishing craft. Once a plank-built craft of coconut wood, the dhoni of today is very often an FRP boat. The first 70 ft. FRP masdhoni was built in 1997; MoFAMR decided to introduce and popularize a 85 ft. masdhoni; today wheelhouse-equipped masdhonis of 107 ft are under construction. Larger boats and multi-day fishing have captured the fishers' imagination. An FAO fiberglass expert has prepared a manual on FRP boatbuilding. The government wants a strong focus on craft of sound design and stability, on cost-effectiveness, and proper training for fishers.

The December 2004 tsunami killed more than 80 fishers in the Maldives and caused damage worth $25 million. Support and technical assistance – mainly for new boats, and housing for fishermen – have been mobilized from the FAO, UNDP, World Bank and IFAD. The government is keen to "build back better," to ensure that everyone is better off than they were before the tsunami.

Right and opposite page: Boat building yard at Gaafaru, boats under construction, plastering in progress by a carpenter, fisher children.

Taking the Code to the Grassroots

Report of a one-day consultation with stakeholders, including fisher communities of Tamil Nadu, on the Code of Conduct for Responsible Fisheries

It was both substantive and productive. And for once, fishers held the stage. It was wonderful to see fishers from Chennai and other parts of Tamil Nadu speaking with flair and feeling on matters that affect them most – fisheries and their livelihoods.

The date: June 29, 2007. The occasion: a one-day consultation in Chennai with fishers, NGO representatives, government officials, and other stakeholders. Subject: The Code of Conduct for Responsible Fisheries and its implementation in Tamil Nadu. Organiser: The BOBP-IGO. Highlight: Release of Tamil-language versions of the Technical Guidelines on Marine Fisheries relating to the Code of Conduct. Participation: nearly 50 persons, including some 35 fishers.

Dr Y S Yadava, Director, BOBP-IGO, welcomed the gathering. In his inaugural address, Mr Ajay Bhattacharya, Joint Secretary to the Government of India, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, urged the Government of Tamil Nadu to ensure that the fishing community reaped tangible benefits from implementation of the Code of Conduct.

Mr Bhattacharya pointed out that fishing areas and fishery resources are limited. While marine fish production has remained constant during the past decade, the number of fishers and fishing boats has gone up alarmingly, and fishers' incomes have gone down. Result: fishermen have taken to fishing with nets of smaller mesh sizes. The Technical Guidelines of the Code of Conduct translated into Tamil by the BOBP-IGO would enlarge understanding of the Guidelines and induce better awareness among fishermen.

Taking the Code of Conduct
or Responsible Fisheries to the Grassroots
29 June 20

Mr Ajay Bhattacharya (right), releasing the Tamil version of the Technical Guidelines on Marine Fisheries relating to the Code of Conduct for Responsible Fisheries.

In a Power Point presentation, Dr Yadava introduced the Code of Conduct and explained the specific aims of the many Technical Guidelines relating to the Code, which were now being made available in Tamil.

Dr S Vijaykumar, Tamil Nadu's Director of Fisheries, detailed the government's schemes for the welfare of fishing communities. Examples:

- Sea ranching of shrimps (*Penaeus monodon*). As many as 45.5 million seed at a cost of Rs 1.35 crores have already been released. Fishers say the shrimp population in inshore areas has gone up as a result. Such ranching will help rejuvenate shrimp stocks.
- The Government does not permit shrimp farming in mangrove areas. A seasonal ban on mechanized fishing has been in force during the past few years. (The ban is from April 15 to May 29 on the east coast of Tamil Nadu, June 15 to July 31 on the west coast. During this period, diesel is not supplied to boats. Fishermen have been co-operating with the ban order.)
- Fishing harbour management committees have been constituted to maintain fishing harbours in the State as per international standards. The Department of Fisheries (DOF) recently conducted a two-day workshop with stakeholders on proper management of fishing harbours and fish landing centers (FLCs). The Department will soon bring out a manual for management of fishing harbours and FLCs, a draft is ready.
- To enhance fish resources, the DOF has taken up a programme

on artificial reefs (ARs) with the help of the Central Marine Fisheries Research Institute (CMFRI) and the Tamil Nadu Fisheries Co-operative Federation. The Department has implemented this scheme in 10 places during the past three years. Fishermen have reported an increase in fish biomass from areas where the reefs are located. The CMFRI is now trying to involve local NGOs in this programme. The Department has given fishers solar dryers, and trained them to reduce fish spoilage.

- Other activities: promotion of tuna fishing to reduce pressure on inshore areas and encourage diversification; setting up of the Fishermen Welfare Board and Fisheries Advisory Committees; welfare schemes such as housing, insurance and saving-cum-relief; strengthening of fisheries research and statistics; a ban on the fishing of endangered species such as sea horses and chanks; a ban on pair trawling to conserve resources.

Dr Vijaykumar said the DOF would like mesh size regulations to curb juvenile fishing to be enforced at the manufacturing stage itself – by the manufacturing units.

Dr Vijaykumar said that a project on development of fisheries policy in Tamil Nadu, to be funded by the World Bank and executed by the FAO, would commence soon. The project could be a role model for other states too. The State Government would also receive Rs 12 crores from Japan under a World Bank Project to set up a modern fish processing complex.

The DOF has set up a 'Touch Screen' system, with the help of the Electronic Corporation of Tamil Nadu (ELCOT). (Just touch the screen with a pen or pencil to get highlighted information on various aspects of fisheries.) The DOF is also trying to provide fishers with seamless communication units, which will be equipped with an inbuilt Global Positioning System.

Dr Vijaykumar said that 90 per cent of the boats in Tamil Nadu are now registered. Such registration, and display of registration numbers on boats, is compulsory. Life jackets are being provided to fishers, also subsidies for ice boxes and nets. 360° lanterns will be given to fishers to ensure their safety during night fishing.

Dr Vijaykumar said the DOF had imposed a fine on fishing boats straying across the India-Sri Lanka international border, but this order had been stayed by a court. Assistance for sales tax exemption had been given to boats registered ***before*** the Tenth Five Year Plan. Similar assistance for boats registered ***during*** the latter period had been requested from the Ministry of Agriculture.

Following Dr Vijaykumar's detailed overview, the fishing community expressed its views frankly – not just about the Code but about all aspects of small-scale fisheries and their livelihoods. Their remarks and suggestions, and those of other participants, have been grouped under six major heads.

(i) Popularizing and raising awareness about the Code of Conduct

1. Hold grassroots-level meetings regularly with stakeholders.
2. Create and raise awareness about the Code through street meetings, beach meetings, theatre, street plays, folk songs, cultural programmes. Involve community leaders and the media in these meetings.
3. Popularize the Code in villages through TV, ads and pamphlets in public places like bus stands and cinema halls (especially in coastal areas), and slide shows on conservation.
4. Make the Code of Conduct a part of the school curriculum, so that children learn early about conservation and sustainable fishing methods. Use signboards to teach students.
5. Conduct meetings at district/ taluk/ village level to create awareness.
6. Send fishers abroad, particularly to other developing countries, so that they learn about developments there.
7. Inform fishers about the depletion of shark fisheries, about how birds are being caught by longlines.
8. Organizations like Fishery Survey of India (FSI) should contact local leaders and through them hold meetings with fishers.
9. Distribute copies of the Technical Guidelines far and wide.

(ii) Pollution control

10. Stop water pollution in Tuticorin caused by fly ash from the thermal plant.
11. Stop the release of chemicals into the waters by other industries in Tuticorin, and the discharge of industrial and thermal effluents into the sea.

The Tamil language versions of the Technical Guidelines on Marine Fisheries.

All this is depleting fishery resources and affecting fish breeding. It is even affecting the health of the community.

12. Stop the excessive catch of juveniles.
13. Combat the effects of the atomic power plant, which is affecting marine resources.
14. Too many prawn farms. They are harming fishery resources through release of untreated farm effluents and chemicals. Check and monitor such farms.
15. Put an end to prawn farming in mangrove areas.

(iii) Regulation of gear and mesh size

16. Stop purse-seine operations. They are catching small-sized fishes and are impairing fisheries as a whole.
17. Ban trawling, it is disturbing the eco-system.
18. Permit pair trawling with increased mesh size.
19. Put an end to irresponsible fishing and catches of juveniles. Traditional fishermen are doing this, through methods like purse-seining, mechanized fishermen through small mesh sizes. The government is not tackling the problem.
20. Ban dynamite fishing.
21. Introduce mesh-size control.
22. Stop the use of machine-made nets or regulate mesh sizes of manufacturing nets at the factory itself – it is depleting fishery resources.
23. Hook and line and gill nets are the best gear for fishing. 60 mm mesh size should be used for nylon nets, 120 mm for HDP.
24. Nets of small-mesh size should not be manufactured at all. Cotton nets are good for the fishery.

(iv) Safety at Sea

25. Insure FRP boats.
26. An appeal to the Coast Guard – don't frighten fishermen.

(v) General conservation measures

27. Undertake sea ranching all along the coastline. Done in a few areas, it will not be very beneficial.
28. Implement all acts and rules strictly.
29. Address the problem of fish discards at sea.
30. Fix the quantity of fish to be captured. When a fish ban is in force in Tamil Nadu during the monsoon, Kerala fishers come to Kanyakumari for fishing. Impose a strict ban on fishing for 60 days.
31. Consult all fisher representatives about mesh size before amending the 1983 Acts.
32. The ranching programmes of Tamil Nadu fisheries – a very good initiative. Fishermen should be allowed to take active part in the programme.
33. Create awareness among fishers who have been depleting fishing resources through wrong fishing methods – both mechanized and traditional fishermen are offenders.
34. Police and village committees should regulate fishing. The Government and the Gulf of Mannar protection committee should work together to implement the law and prevent any fishing in the Gulf of Mannar biosphere.
35. Curb poaching of our resources by foreign vessels. Curb poaching in Tamil Nadu by fishermen from neighbouring states.
36. Stop the fishing of juveniles and small fishes.
37. Divide the fishing ban period on the east coast into two periods — one in April, another in September.
38. Introduce a system whereby country craft can fish for four days a week and mechanized boats for three days. This will help conservation.
39. Introduce a token system for sale of diesel to mechanized boats on the basis of criteria such as vessel size, fishing area and number of crew. This will help regulation and monitoring by the authorities and prevent misuse of diesel purchase.
40. Encourage community-based fisheries management.
41. Address the impact of the Sethu Samudaram project on fishery resources.

(vi) Government support

42. Subsidize the kerosene used in OBMs. Extend diesel subsidy to traditional craft.
43. Construct exclusive fish landing centers for traditional

craft. Improve the conditions of all fish landing centers.

44. Provide financial assistance for deep sea fishing.
45. Diesel makes fishing uneconomical. It takes up 70 percent of the expense of mechanized boat fishing. Develop fuel alternatives like gas conversion, etc.
46. Provide subsidies for kattumaram fishing.
47. Provide assistance for FRP boats and diesel, and insurance for these boats.
48. Mr Saravanan of DHAN Foundation, Chennai, said his organization carried out several extension and awareness programmes and had started a number of IT centers in villages. Literature published by BOBP-IGO, including the Technical Guidelines of the Code, could be uploaded on the website of the DHAN Foundation, so that users of the IT Centres could access them. He asked for a set of CDs of the Technical Guidelines.
    Mr Saravanan said that existing traditional knowledge in fisheries, which was considerable, should be tapped for resource conservation. The Code of Conduct could be incorporated in traditional fishing practices.
49. Mr C M Muralidharan, FAO Consultant, United Nations Tsunami Recovery Support Project, referred to the catch of juveniles by fishers using small-mesh sized nets. He suggested that controls on such gear be introduced at the manufacturing end. Likewise, marketing controls would put an end to the trade in juveniles. Policy should be formulated in consultation with stakeholders at different levels. He said the study on the use of the token system for diesel purchase in Palk Bay could help reduce fishing pressure by trawlers. The study was being carried out by the South Indian Federation of Fishermen Societies with assistance from Netherlands.
50. Dr H Kasim, Principal Scientist, Central Marine Fisheries Research Institute (CMFRI), discussed implementation of the Code in Tamil Nadu. He said that fishermen should exercise self-control and avoid overfishing, they should realize its repercussions. Institutions like the CMFRI and the FSI were willing to extend the results of their scientific research; fishers should invite the experts to their villages for meetings. He said the 45-day ban on mechanized fishing in the east coast (April-May) and the west coast (July-August) is helping conservation by reducing fishing effort.
51. Deputy Commandant Anupam Rai of the Indian Coast Guard (ICG), Chennai said that the ICG interacts regularly with the fisher community, especially on safety at sea. He would inform the ICG headquarters about the publication of the Technical Guidelines, which would be very useful. He said that the emergency contact No 1718 for distress at sea is now supported by telecom service providers such as VSNL & BSNL. The ICG is also getting the six-digit number 155211 changed to 1554, a number already in use in Saurashtra.

    He said the ICG is working with the Indian Space Research Organisation on communication aspects; it is interacting with Bharat Heavy Electronics Limited (BHEL) for the manufacture of low-cost EPIRBS (Emergency Position Indicating Radio Beacons), and with Antariksh/ Defence Research Development Organisation (DRDO) on a low-cost Vessel Monitoring System (VMS). A VMS hub is being set up in Porbandar, Gujarat. So far 15 EPIRBs have been set up on boats on a trial basis. The ICG is also working with mobile companies for setting up a distress alert system.

    Mr Rai requested fishers to be accurate while reporting fishers missing at sea. The ICG should be given regular updates on the status of a missing boat, say every eight or 10 hours. He said fishers don't seem to bother much about safety. They don't carry life jackets, and don't wear them even if they have one.

    He said the sea-worthiness of fishing vessels constructed after the tsunami was questionable. He complained that some fishers operate close to data bouys and damage the equipment – the ICG has received some complaints on the issue from the National Institute of Ocean Technology. Fishing close to data buoys and oil rigs should be avoided. In fact, fishing was prohibited within a range of 1 000 meters from oil rigs. Many boats did not bear clear registration numbers. In conclusion, he urged the fishing community to give the ICG information on what was happening at sea, it would serve as intelligence support.

52. Mr P Sivaraj, Zonal Director, FSI, described the awareness campaigns carried out by his organization on safety at sea, including popularization of the Code of Conduct. A meeting on sea safety was held recently at Marakkanam, and provisions of the Code were explained to fishers.

53. Mr R Ravikumar, Regional Coordinator, FAO Safety at Sea Project, said he was most impressed by the views of fishers at the consultation. Their participation was necessary for policy-making, and should be encouraged at the stage of policy formulation as well as implementation. He referred to Article 6 and Articles 8 and 8.25 of the Code, which concern safety at sea.

54. Mr Muthuswamy, Joint Director of Fisheries, Tamil Nadu, said that while issuing tokens to mechanized boats for supply of diesel, the authorities concerned should ensure that various requirements – such as registration, insurance, etc – were complied with. Mesh sizes should be controlled to prevent catch of juveniles. The Code of Conduct and its Technical Guidelines should be presented in more simple form, such as comic books. Village administrative committees should be utilized for popularizing the Code, and in general for implementing rules and regulations.

Conclusion

Fisher-participants said the consultation was very useful and would help more effective rehabilitation of fishers. The work initiated by the consultation should continue. In fact, more such consultations should be organised.

Many fishers said that the tsunami was a calamity but an opportunity as well. New programmes for fishers should be considered. The tsunami has brought about a situation where there are no labourers any more; those who never owned boats now do. It has been a great social leveler, and given many poor fishermen rich opportunities. These should be put to good use to bring about a better society.

In concluding remarks, Mr Bhattacharya said that the recent marine census conducted by the Ministry of Agriculture provided a good idea of the size of our fishing fleet. Marine fish production has remained constant for many years, it should be developed sustainably. He requested the Tamil Nadu Government to do what it could to implement the Code and its guidelines.

Dr Y S Yadava proposed a vote of thanks.

Taking the Code of Conduct
for Responsible Fisheries to the Grassroots
பொறுப்பார்ந்த மீன்வள நடத்தை விதித் தொகுப்பை
அடித்தளத்தில் உள்ளோருக்கு கொண்டு செல்லுதல்
29 June 2007, Chennai
29 ஜூன் 2007, சென்னை

CMFRI - India's premier facility in marine fisheries research

The Central Marine Fisheries Research Institute (CMFRI), the largest of India's eight national fisheries research institutes, assists and advises policy-makers in fisheries governance and in sustaining marine fish production. Six decades of R & D in marine fisheries by CMFRI have led to impact on many fronts.

The Institute began in Madras (Chennai) on 3 February 1947. It was known initially as the Central Marine Fisheries Research Station. It was shifted to Mandapam Camp in southern Tamil Nadu in September 1949 and finally to its present headquarters in Kochi, Kerala, in July 1971.

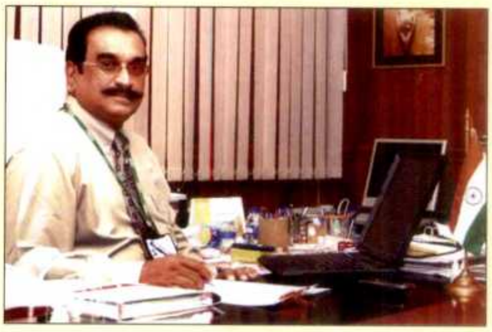
CMFRI has three regional centres (Mandapam, Veraval and Visakhapatanam) and seven research centres (Mumbai, Mangalore, Karwar, Kozhikode, Vizhinjam, Tuticorin and Chennai) with 10 research divisions and a total sanctioned staff strength of 938 (scientific 189, technical 330 administrative 150, supporting 263 and auxiliary 6). The Institute currently has 111 scientists, 306 technical hands, 142 administrative staff and 225 supporting staff.

CMFRI's Mandate

- To undertake basic, strategic and applied research in marine fisheries and mariculture.
- To monitor and assess the fisheries resources of the Exclusive Economic Zone (EEZ) and to understand the stock and its dynamics in relation to environmental and human interventions.
- To develop and commercialize hatchery and production system

Headquarters of the CMFRI at Kochi.

Prof Mohan Joseph Modayil, Director, CMFRI, Kochi



Prof Mohan Joseph Modayil took over as Director of CMFRI in 2000. He was earlier Professor and Head of the Department of Fisheries Resources Management at the College of Fisheries, Mangalore where he served for 30 years. He holds a first class M Sc degree in Marine Biology and Fisheries, a Ph D in Bioscience, and a D Sc in Aquatic Biology and Fisheries.

Prof. Modayil has served in many capacities in India and abroad. Development research being his passion, he was co-coordinator of many international projects sponsored by the UK's ODA (later DFID) and the IDRC in India and Thailand, Philippines, Malaysia, West Indies. He was also as a consultant for IFRTO in the Islamic Republic of Iran.

During the past seven years, Prof Modayil has been instrumental in modernizing the infrastructure of the Institute at its headquarters and at its 10 research centers. He has served on many national committees of the Ministry of Agriculture, and the Ministry of Environment & Forests. He is an elected fellow of the Zoological Society of London and an International Council Member of the Asian Fisheries Society, Philippines. He has to his credit more than 100 scientific publications in national and international journals and has edited 12 books. He can be contacted at mohanjosephmodayil@gmail.com.

technologies for finfish, shellfish and other commercial marine organisms in coastal and open seas.

- To build up a database on marine biodiversity, and carry out research on fragile marine ecosystems for their conservation and restoration.
- To undertake research on utilization of potentially beneficial marine organisms.
- To act as a repository of information on marine fishery resources with a systematic and analytical database for policy interventions and to carry out research on the social and economic costs and benefits of marine fisheries.
- To conduct front line demonstrations and training to develop human resources for R&D in capture fisheries and mariculture.
- To create awareness and provide training and consultancy services.

Facilities

The headquarters has a **modern library** that conforms to international standards and practices, with subscriptions to over 400 journals and periodicals, and 14 Internet cubicles. **The Marine Biodiversity Museum** at the headquarters showcases the unique biodiversity of marine life in the Indian coastal region. It is one of the largest of its kind in Asia with over 1 500 exhibits exclusive to the Indian seas. Its collection of hard corals from Indian waters and ascidians is unique.

A central laboratory was established in 2006 at the headquarters. It uses the latest equipment — such as a bomb calorimeter, automatic tissue processor, refrigerated microtome, trace metal analyzer, ultra freezer, refrigerated centrifuges, spectrophotometers, cryostat microscopes, etc. **An aquarium** with 40 species of ornamental fishes collected from different parts of the country has been established at the headquarters. CMFRI is the pioneer in developing breeding technologies for marine ornamental fishes.

The CMFRI Museum (above and below).

The marine fish farms of the Institute are located at the following places:

Mandapam Camp: A fish farm of 3.8 ha area and a lagoon of 227 ha are available for mariculture activities.

Tuticorin: A fish farm with a water spread of 2.5 ha.

Narakkal: The 4 ha *Krish Vigyan Kendra* (KVK) Campus at Narakkal has four shrimp farm ponds each of 0.1 ha, besides an open wild watershed of about 2 ha.

Chennai: A shellfish hatchery functions in an area of 1.5 acres at Kovalam near Chennai.

Calicut: An area of 1.22 ha has been partly developed into a fish farm of five ponds, each of 0.25 ha. It is now being fully developed into a modern hatchery system of five broodstock ponds of various sizes and hatching & rearing facilities.

The wet laboratories and hatcheries facilities include onshore hatchery-cum-culture facilities at Visakhapatnam and Calicut. Three bivalve hatcheries have been set up at Tuticorin – one each for pearl oyster, edible oyster and clam – and a shrimp hatchery at Mandapam. A Marine Research Aquarium has also been commissioned in Calicut.

Some recent achievements of CMFRI

a) **Stock assessment, biodiversity and informed fisheries governance:**

- The Institute has developed, standardized and implemented the **Multistage Stratified Random Sampling Design** to estimate marine fish production along the Indian coast. District-wise, state-wise, gear-wise and species-wise production estimates have been made through this design continuously from 1947. It has developed and tested software for statistical analysis of marine fish landings. It has comprehensively studied the **highly migratory straddling stocks** of tunas and seerfishes. It has regularly monitored **marine pollution in coastal waters**, the hot spots of pollution and their effects on the marine ecosystem. The marine fisheries census 2005 conducted by CMFRI to **estimate fisherfolk population, craft, gear,** etc, serves as a database for policy-makers at the Center and the states.
- **Resources of sponges, corals and echinoderms** have been assessed. Evaluation of **genetic heterogeneity** in marine ornamental fishes like clown fishes and damsels is another achievement. In a pioneering study of the ornamental fish resources of Lakshadweep islands, 165 species were identified and the biology and stock of 40 species studied and documented in the publication "Marine Ornamental Fish resources of Lakshadweep".
- **Optimum mesh size and fishing effort** have been determined for all major fisheries. Strategies for the conservation and management of overexploited, endangered and threatened stocks have been devised. **Potential fishing grounds** have been identified through onboard surveys in the EEZ of the country.
- Continuous monitoring of oceanographic parameters and estimation of **primary and secondary production in the seas around India** led to charting on the abundance of the phytoplankton and zooplankton biomass and projection of potential yields.
- Communication tools for the Responsible Fisheries Extension Module (RFEM) have been designed, validated and disseminated.

b) **Mariculture:**

- **A breakthrough was achieved in captive breeding and hatchery production of slipper lobsters.**
- **A package of practices for culture of green mussel and edible oyster** was developed and commercialized.
- Packages of practices for **cultured marine pearl production** were developed and standardised. The Institute has for the first time developed a technology for land-based pearl production. Success has been achieved in producing large pearls of 5-8 mm size. A breakthrough has been achieved by developing a **tissue culture technology** for marine pearl production using the pearl oyster *Pinctada fucata* and abalone *Haliotis varia* for the **first time anywhere.** Technology for **sea ranching** of shrimp and molluscan seed produced in the hatcheries was developed and tested at Tuticorin and Mandapam.
- The Institute has achieved broodstock development, maturation, sex reversal, spawning, fertilisation and hatching of groupers such as *Epinephelus tauvina* and *E. polyphekadion.* Culture of seaweeds in open coastal waters has been successfully undertaken and its **feasibility demonstrated in the Gulf of Mannar.**
- The Institute has developed technologies for broodstock development, **breeding and larval rearing of marine ornamental fishes such as the clownfish** (*Amphiprion chrysogaster*) and the one-spot damselfish *Chrysiptera unimaculata*. A second-generation seahorse (*Hippocampus kuda*) has been produced in captivity. The Institute has achieved a **breakthrough in the seed production and larval rearing** of the sea cucumber *Holothuria spinifera* which is in great demand for export.

c) **Biotechnology:**

The Institute has developed a quick and cost-effective **Duplex PCR Assay** to detect the White Spot Syndrome Virus. It has also developed a simple low-cost shrimp feed (*MAHIMA*) and facilitated the setting up of small-scale industrial units in central Kerala to manufacture the feed.

CMFRI's contributions

(i) Fish stocks assessment and resource management

The Institute has been continuously monitoring the status of fisheries exploitation as well as the ecological health of the stock. This is an enormous task considering that India has an EEZ of 2.02 million sq. km., 3 202 fishing villages and more than 3 000 fish landing centres spread across a coastline of 8 129 km; a multi-species, multi-gear fishery consisting of over 200 commercially important finfish and shellfish species; a fishing fleet comprising 58 911 mechanized boats, 75 591 motorised crafts and 10 4270 non-mechanised crafts; and over five million people who depend solely on fisheries for their livelihood, directly or indirectly.

CMFRI has been responsible for developing time-series databases on marine fish production from India's EEZ, as well as on biology, distribution, abundance, fishery forecasts of potential yield, stock assessment and management. The information thus generated has enabled management decisions by the Government. The Institute's exploratory surveys have helped discover new and rich fishing grounds and paved the way for a vibrant seafood export industry. CMFRI can now explore deep-sea resources up to a depth of 400m along the southwest and southeast coasts.

The Institute has successfully addressed issues of ecosystem health, biodiversity conservation and coastal pollution. It has published stock estimates for nearly 50 species of finfishes. The potential estimate of marine fisheries resources in India has been revalidated to 3.934 million tonnes. The Institute's GPS-enabled database provides vital information on features of the ecosystem – such as biodiversity hotspots, threatened marine habitats, potential mariculture sites and pollution hotspots along the coast.

(ii) Transfer of technology

A number of public and private sector establishments in the country have relied on CMFRI know-how on environmental impact assessment, hatchery technologies, molecular diagnostics, and biotechnology. The Institute has so far earned Rs. 37 million through consultancy programmes.

Mariculture technologies developed by the Institute for the **culture of finfishes, pearls, mussels, clams, crabs, lobsters, sea cucumber, marine ornamental fishes, seaweeds** and other cultivable organisms in the sea have opened up avenues for entrepreneurship, higher production and more jobs. In the process, they have empowered women, improved the status of fisherfolk and stimulated fishing industry growth.

CMFRI has successfully developed and popularized hatchery technologies for commercially important marine organisms like prawns, crabs, lobsters, ornamental fishes, seaweeds and finfishes. The Institute has achieved a breakthrough in pearl oyster technology by developing a basic technique for tissue culture of pearl. A global patent has been filed for this technology.

Culture of farmed mussels in the southwest coast has gone up from zero in 1996 to 10 000 tonnes in 2006-07, establishing the commercial viability of the technology. It is now getting immensely popular along the Malabar and Konkan coasts through self-help groups and entrepreneurs.

The Institute has pioneered the concept of open sea farming through cage culture technology. Finfish cages have been successfully launched along the east coast, ushering a new milestone in mariculture technology. Three more are being installed in Ratnagiri, Diu and Mandapam.

The Institute's dissemination of research knowledge during the last six decades has been impressive, with more than 5 000 research papers in international and national journals, 100 special publications, many information bulletins, brochures and newsletters, 53 volumes of the flagship *Indian Journal of Fisheries*, and 193 issues of the *Marine Fisheries Information Service* bulletin. The CMFRI website is regularly updated.

The Institute's HRD and outreach extension programmes have an enduring brand identity. The Agriculture Technology Information Centre helps fisherfolk with services and technologies. CMFRI training programmes in hatchery technologies and scuba diving (conducted on demand by regional research stations of the institute) are popular with fisherfolk. CMFRI assists HRD in fisheries through the post-graduate programme of the Central Institute of Fisheries Education.

(iii) Policies related to marine fisheries and mariculture

CMFRI assists the Government of India in formulating its marine fishing policy. The Institute recently examined the impact of the monsoon-fishing ban on behalf of the Ministry of Agriculture. Multi-disciplinary researches in marine capture and culture fisheries have won it recognition as a premier institute.

Major thrust areas of CMFRI in recent years

Marine Capture Fisheries: Policy advisories for fisheries management; Short-term and long-term forecasts of fishery yields; Impact of gear on fished stocks; Trophic modelling of major marine ecosystems; Simulation of fishery yields and biomass under various scenarios; Application of remote sensing for fisheries forecasts on a GIS platform; Tag-recovery studies on straddling and migratory stocks; Impact adaptation and vulnerability of Indian marine fisheries to climate change; Impact of fisheries on biodiversity and quantification of biodiversity loss; Estimation of biomass of DSL and mesopelagics of the Indian seas; Creation of a marine biodiversity registry of the country; Rebuilding of vulnerable and overexploited stocks to the 1985 level by 2015.

Mariculture: Development/ standardization of hatchery and farming technologies for potential marine shrimp species, lobsters, brachyuran crabs, king crabs and molluscs leading to commercialization; Development of technologies for seed production and farming of high-value species such as grouper, snapper, bream, and tunas; Open-sea cage farming of carnivorous marine fishes; Development of appropriate technologies for at least a dozen species of marine ornamental fishes of international commercial value and demand; Development/ standardization of technologies for sea ranching of commercially important crustaceans, molluscs and sea cucumbers to augment natural stocks; Development of farming technologies for marine organisms of pharmaceutical importance; Consolidation and transfer of mariculture technologies of pearl oyster, edible oyster, clam, mussel,

Facilities at the CMFRI headquarters - electron microscope (left) and marine aquarium (right).

chank, sea cucumber, seaweed, shrimp and finfishes and their integration with artisanal capture fisheries; Development of blacklip pearl oyster farming technology and production of black pearls; Organic farming protocols for marine organisms.

Marine Biotechnology: Genetic improvement of marine cultivated species through selective breeding and hybridization; Endocrinology and reproductive physiology of cultivable marine organisms; Bioinformatics and gene library of existing and emerging marine pathogens; Bioconversion of raw material to enrich feed ingredients and reduce anti-nutrients; Bioprospecting for secondary metabolites from marine invertebrates, algae and microbes for use in disease management; Molecular taxonomy of marine organisms to develop PCR based identification tools

Major strengths of the CMFRI

- **Human resources – core competency:** 111 scientists qualified in various disciplines relating to marine fisheries and mariculture.
- **Research network:** Three regional, seven research and 15 field centres enable the Institute to address location-specific problems in marine fisheries and mariculture. Links with reputed R&D organizations within and outside the country strengthen the network.
- **Infrastructure:** State-of-the-art laboratories and hatcheries carry out research in fishery biology, marine ecology, hydrography, biodiversity, statistics, marine biotechnology, economics, extension, and mariculture.
- **Resource monitoring and technology transfer:** The Institute's network of research/ regional and field centres constitutes a strong resource monitoring system. The Institute's economic analysis of marine fisheries —- including evaluation of marine fish landings, economics of craft-gear combinations, price spread and market dynamics – has been valuable. Information is taken to the field through industry-farmer meets, village level meetings, training programmes, symposia and exhibitions. The Institute's Agricultural Technology Information Centre serves as a single window delivery system for end-users.

Cooperation with other fisheries institutions in India and abroad

CMFRI has been collaborating with various national and international research and developmental institutes. These include the FAO, World Fish Center, IFS, SEAFDEC, Wagenigen International, BOBP-IGO and the Marine Stewardship Council The Institute has provided technical advice to countries like Iran, Mauritius and Bangladesh.

Vision of CMFRI

The Institute hopes to develop an information-based management system for changing over from open access to a regulated regime in marine fisheries, for augmenting coastal fish production through mariculture and sea ranching and for restoring critical marine habitats. In this context, CMFRI has identified the following thrust areas:

Fishery yield forecasting through modeling; Trophic modeling of marine ecosystems; Straddling and migratory fish stocks; GIS-based fishing and mariculture sites; Impact of climate change on marine fisheries; Hatchery technology for marine food fishes and their farming; Genetic improvement of farmed fishes; Bioinformatics and gene library of marine pathogens; Molecular taxonomy; Black lip pearl oyster farming and tissue culture technology; Open sea cage farming; Demand-supply, cost-benefit analysis; Policy research, WTO, CBD, IPR, TRIPS Impact; Conservation research; Impact analysis.

The CMFRI has a great future as a centre of excellence in mariculture and marine biotechnology and as a nodal organization for fisheries sustainability and management in the Indian Ocean.

Review of Marine Fisheries in Orissa

Small-scale fisheries in Orissa (often symbolized by images of svelte women hurrying on the beach in Puri with headloads of fish) is a story of untapped resources and unrealised potential.

The BOBP-IGO recently carried out a study for UNDP on marine fisheries in Orissa. It related to the marine fishery infrastructure, the socio-economics of marine fishers, and the institutional structure governing their activities.

Primary data for a sample study was collected between December 2006 and March 2007 in six coastal districts of Orissa – Ganjam, Puri, Jagatsinghpur, Kendrapara, Bhadrak and Balasore. Data was obtained on the income, education and assets of fishers. Group discussions were held with fishers and their associations. Discussions were also held with Department of Fisheries (Dof) officers about problems faced in marine fisheries and possible solutions. The BOBP-IGO team visited major landing centres in the six coastal districts and talked to user associations about the marine infrastructure.

Some of the study's many objectives: Review marine fish production in Orissa for the period 1950-51 to 2004-05 and correlate it with harvestable potential. Assess the marine fishing fleet, the extent of motorization and mechanization and the use of sea safety measures. Evaluate shore-based infrastructure. Assess resource enhancement through fish aggregating devices, artificial reefs, mariculture and seaweed farming. Study the Orissa Marine Fishing Regulation Act (OMFRA), 1982. Review policy measures like closed seasons, closed areas and their impact on fisheries. Review the institutional support available for marine fisheries development, credit linkages, role of gender and human resource development.

Some of the study's findings and impressions are presented here in Q & A form.

Is marine fisheries production in Orissa falling? What are the basic facts regarding production and the condition of fishers?

Most fishing activity is in coastal waters; deeper waters remain untouched. Marine fish production has recorded a fall over the past seven years – from 0.16 million tonnes in 1997-98 to 0.12 million tonnes in 2004-05. About 3 000 sq. km of water area falls under reserve forests and is not available to fishers.

But actual fish production from Orissa waters is higher than the figures show. Reason: Trawlers from Andhra Pradesh and West Bengal fish in Orissa but land their catches in their respective states. Many Orissa trawlers also land their catches in Digha, West Bengal.

During the last two decades, the fleet size has gone up substantially in relation to fisher population. The trend is continuing. Mechanized boats have gone up in number by 250 percent in 25 years (from 692 in 1981 to 1 796 in 2004-05). Motorized boats numbered 2 467 in 2005, up from 820 (1990), an increase of 422 percent in 165 years. Non-motorized boats (catamarans, bar boats, navas, dingis, potial./botali and choat) have actually fallen in numbers – from 6 000 in 1975-76 to 4 220 in 2005.

An IT kiosk set up in a fishing village to provide information on potential fishing zone and weather conditions.

The existing infrastructure of three fishing harbours and seven fishing jetties can accommodate only about one-fourth of the state's mechanized boats.

The maximum sustainable yield of commercially important marine species up to 200m depth is estimated at 0.161 million tonne. About 76 percent of the potential MSY is being exploited annually at present.

The average per capita income of marine fishers is low - Rs 1 000 per month. Health, education and housing are unsatisfactory. Nearly half of the fishers have health problems. Balasore is the poorest district in terms of health – 62 percent of the respondents have reported health problems.

Almost 85 percent of Orissa's fisher population belongs to the age groups 6 to 17 and 18 to 59. The fishing industry already shows signs of overcapacity; this may worsen with new entrants to the work force. Young fishers are not optimistic about the future of fisheries in the state and are migrating to fishing and other industries in Mumbai, Goa, Gujarat and Kolkota. Those who remain in Orissa find few livelihood alternatives.

More than one-third of the fishers feel that in coming years, the fisheries situation in Orissa will worsen – due to factors such as rising prices, debt burden, declining fish stocks, restrictive government policies. Artisanal fishers say fishing by mechanized boats in their fishing zone is harming their livelihoods.

For fisheries production to go up and the condition of fishers to improve, various productivity and management constraints must be tackled.

What is Orissa's present infrastructure for marine fisheries?

Sixty four landing centres along the coast of Orissa cater to the needs of fishers belonging to 647 fishing villages. Mechanized fishing boats operate from 19 fish landing centres (FLCs), a minor fishing harbour (MFH) in Dhamra and a major fishing harbour (FH) at Paradeep.

All harbours except Paradeep (which is 100 % Centrally-sponsored) and the fish landing centers have been constructed with 50 percent assistance from the Central Government. There are 18 boatyards in private and public sectors, most of them in and around Paradeep, and six-net making units.

Processing: Of the 367 freezing plants in the country, 21 units are located in Orissa with a capacity of about 342 metric tonnes per day. The total capacities of these units are as follows: ice plants 1 519 tonnes, cold storages 5 102 tonnes, chill rooms 220 tonnes, peeling sheds 125.4 tonnes and processing plants 388 tonnes.

Marketing : Marine fish marketing in the State has both domestic and export components. About 71 percent of the marine fish is consumed as fresh, 22 percent goes for drying, 7 percent is frozen. About 49 percent is quality fish, 51 percent comprises small and miscellaneous varieties. About 40 percent of Orissa's marine catch is used for local consumption – of which nearly 90 percent is in the coastal districts.

Headload on foot, and bicycles, are the most common mode of transport for cheaper fish varieties in villages and small towns. Better-quality fish is collected by middlemen from landing centres and transported to wholesale markets in Cuttack, Berhampur, Bhubaneswar and Rourkela by road and rail for marketing through retailers. Kolkata is the biggest market outside the State for marine fish. Marine fish marketing in Orissa is carried out by a large number of intermediaries forming a long chain of market channels.

Fisheries infrastructure, active fishers and fish production in Orissa during 2005-06

District	Landing Centres	Infrastructure	Number	Active fishers	Production (Tonnes)
Balasore	13	FLC	6	52 190	33 788.50
Bhadrak	10	MFH+FLC	3	15 853	10 856.20
Kendrapara	8	FLC	4	10 222	7 970.89
Jagatsinghpur	5	FH+FLC	2	19 645	31 007.63
Puri	12	FLC	1	12 627	28 557.00
Ganjam	16	MFH+FLC	1	10 745	10 033.65
Total	**64**		**17**	**1 21 282**	**1 22 213.87**

Significant quantities of low value fish are dried and marketed within and outside the State. As the drying of fish is carried out in a primitive and unhygienic manner, the product commands low value.

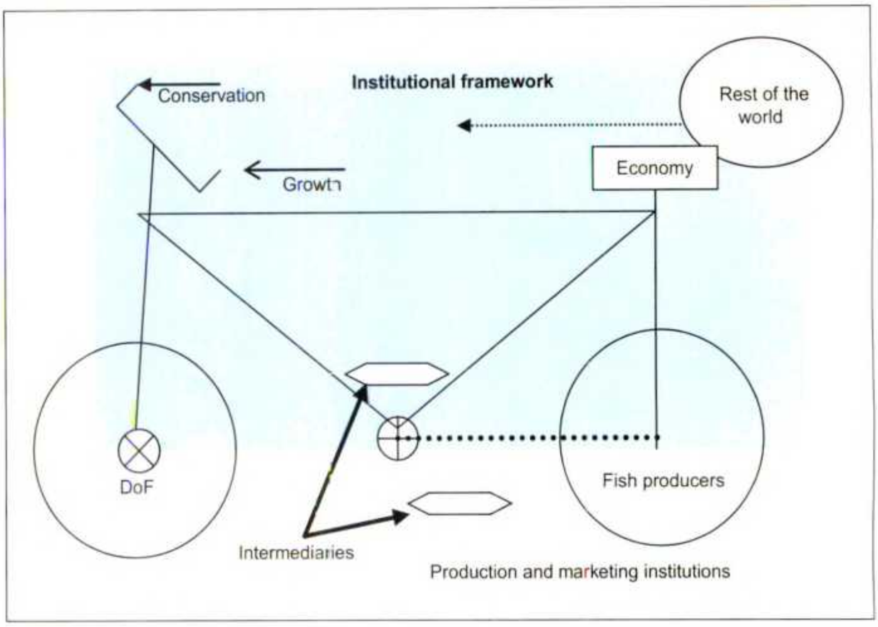
What are the productivity and management constraints to marine fisheries cited earlier?

Production and productivity constraints relate to the pre-harvest and post-harvest fisheries infrastructure; dredging and repair of harbours and fish landing centers; repair facilities for boats and engines; facilities for credit and subsidy; training for fishers and officials; R & D initiatives concerning alternative occupations for fishers; developing a deep-sea fishing fleet.

Management constraints: Total fishing effort should not exceed maximum sustainable yield. Excess fishing effort should be siphoned off. Alternative livelihood options must be developed. Sufficient revenue should be derived from marine capture fisheries through market linkages. To succeed, a marine fisheries management programme should strive to strengthen monitoring, educate fishers, improve the interaction between the DoF and fishers, manage the infrastructure, and design subsidies to build capacity.

Please describe the growth model proposed for Orissa by the study team.

Sustainable growth is like riding a bicycle. If the bicycle does not move, the rider can't keep his balance. If the rider pays no heed to the centre of gravity, the cycle will topple. Success lies in moving – and moving in synch with the centre of gravity. The ease with which the bicycle moves depends on the condition of the tyres, the free movement of the chain and the motivation of the cyclist. On the other hand, synchronization with the centre of gravity is a function of how well the frame co-ordinates with the wheels.



Bicycle model for marine fisheries management in Orissa

In terms of Orissa's marine fisheries, the front wheel represents the Government (mainly the DoF). The rear-wheel represents the fishers – they are bound by government laws. The pedals are marketing channels, conduits from the fishers to society.

The bicycle frame represents the institutional structure in fisheries. This includes rules and regulations, international treaties, financial institutions and other stakeholders (except the DoF). It also covers the traditional relationships among the fishers, boat owners and intermediaries.

This simple model does not capture the intricate interactions among all stakeholders, but highlights the roles and strengths of the DoF and the fishers. The cycle's movement depends on the ease with which market forces operate among fishers and society. This may be described as a **productivity constraint**. Managing the movement (enforcing the institutional structure) depends on the strength of the frame and its co-ordination with the wheels. This may be described as a **management constraint.**

Ensuring sustainable development

The four broad goals of sustainable development of marine fisheries in Orissa are: Optimisation of the fishing fleet, including exploitation of deep sea resources; development of pre-harvest and post-harvest infrastructure and markets; enhancement of skills and capacities of stakeholders; institutional and policy support for sustainable fisheries and livelihoods.

Future development of marine fisheries in Orissa will depend on the attainment of these goals. The study team has discussed these four factors and developed a road map.

Optimisation of fishing fleet

Two steps are essential. A part of the existing mechanized fleet must be developed for deep sea fishing.

New mechanized boats should be allowed only for deep-sea fishing.

The fishing fleet is aging. Most present boats are unsuitable for deep sea fishing. Paradeep is the only harbour which can handle deep-sea fishing boats.

A new fleet with an OAL range of 15-20 meters can be considered for deep-sea fishing in the long run (five years and beyond.) Fishing harbours must be developed in Puri and Ganjam for the southern coast. Institutional finance must be arranged for mechanized boat owners to encourage them to develop deep sea vessels.

Development of pre-harvest and post-harvest infrastructure

In the short term, existing infrastructure should be repaired and managed. The long-term objective would be to develop new infrastructure facilities, such as FLCs, to cater to the needs of fishing fleet. After infrastructure is developed, the DoF should explore new markets for fishery products – such as the northeastern states for dry fish.

The north-south divide in Orissa marine fisheries should be addressed. At present, mechanization in north Orissa approaches saturation point while south Orissa is much less mechanized. Better north-south balance is essential.

Traditional landing centers at Pentakotha, Nuagarh, Chandrabhaga, Sana Arjipalli and New Golabondho should be developed into modern fish landing centers. Atharbanki in Jagatsinghpur could be considered for development into a fishing harbour.

For managing pre-harvest and post-harvest infrastructure projects, the government could consider mechanisms like build-operate-transfer, public-private partnership and Government-community partnership.

Value addition activities in post-harvest fisheries management – such as fish drying and packing, and preparation of fish pickles – can employ women in large numbers. Such activities can be linked and funded by other development projects for marginalized women.

Enhancement of skills and capacities of the stakeholders

Fishers have identified the following areas for skill training – value addition; sea-safety measures; deep sea fishing and use of gear; alternative livelihoods like mariculture. The DoF on the other hand, considers the following as important: implementation of the Code of Conduct for Responsible Fisheries; Monitoring, Control and Surveillance programmes, including data collection procedures. If the government promotes a co-management model, it has to build leadership among fishers. Awareness should be created among fishers about government schemes meant for them, and whose benefits they are entitled to.

As for training of officials, field staff and junior officers need to be introduced to fisheries management; middle-level officers need training in advanced fisheries management (including stock assessment, environmental impact assessment, data interpretation, integrated sea use planning, etc) Senior staff need training in fisheries development and policy formulation (including integrated coastal area management, international laws and regulations, socio-economic analysis, etc).

Monitoring, Control and Surveillance

An efficient and effective MCS programme is the key to sustainable fisheries, also to success in implementing any planning strategy. Without MCS, a fisheries management scheme would be incomplete and ineffective.

MCS tools – such as a participatory management plan, data collection systems, communication systems – need to be developed.

MCS measures are as a rule costly to implement. But these costs can be significantly reduced by encouraging community participation.

Subsidies have perhaps enabled the survival of marine fisheries in Orissa. But they should be phased out in five to 10 years. Money should be spent on more productive activities like R & D, market research, etc. As for the credit needs of small-scale fishers, localized micro-credit institutions should be encouraged to meet small-scale credit needs such as net and engine repair.

Co-management

The study makes a case for co-management – with the responsibility for resource management being shared between the government and various user groups. This limits government cost to surveillance – and community effort can be tapped for this as well.

Some fishers have pointed out that the fisher representatives in monitoring committees set up by the government seem powerless to raise fishers' concerns and protect their interest in issues relating to reserved forest areas. They say that unless *de jure* power is delegated to them, participation in co-management programmes will not protect their interests.

Going by the bicycle model, the frame should be supported by the two wheels; Government and the fishers should work together for dynamic movement. To make co-management effective, the government should engage the fishers in preparing and modifying rules and regulations. The community can then internalise the law into their day-to-day activities, rather than viewing the law as something thrust upon them.

What type of co-management best suits Orissa has to be worked out. A system where problems are identified at the local level, and solutions worked out jointly, is worth serious effort.

Recent BOBP publications

Abstracts: The Third International Conference on Fishing Industry Safety and Health

This concise 76-page publication contains the abstracts of some 45 papers presented at the Third International Conference on Fishing Industry Safety and Health, held in Mahabalipuram from February 1 through 7, 2006. It was organized by the BOBP-IGO jointly with the FAO and the Alaska field station of the National Institute for Occupational Safety and Health, USA.

Together, these abstracts open the window to a world of knowledge relating to safety, health, injuries, fishing vessel construction, labour standards, mechanization, training, work processes, fuel use, emergency responses, rescue at sea, monitoring, tsunami rehabilitation etc. Write to BOBP for a copy of the publication.

Socio-economic status of workers in the salt industry in India: a report

This 184-page book was prepared by the BOBP-IGO for the Salt Commissioner, Ministry of Commerce and Industry. It is based on a 15-month field study conducted from September 2004 to December 2005 by an IGO team that met more than a thousand salt workers from seven states – Gujarat, Tamil Nadu, Rajasthan, Andhra Pradesh, Maharashtra, Orissa and West Bengal.

These seven states account for about 99 percent of India's salt production and employ about 100 000 workers a day. The team also met field officers of the Salt Commissioner's office. The IGO team, assisted by local investigators, used a combination of methods – structured and pre-tested questionnaires, interviews, focus group discussions – to obtain reliable data on this un-organized sector.

The study team reported a dichotomy. Salt production has gone up more than eight-fold since independence, from 1.9 million tonnes in 1947 to 1.49 million tonnes in 2003. But an estimated half a million salt workers in India suffer from an array of problems – exploitation, lack of social security, gender bias, poverty, backwardness.

Some of the team's recommendations concerning the salt workers: Create a data base and undertake a full census. Register all salt workers. Guarantee employment. Fix minimum wages. Improve workplace amenities, such as access to potable drinking water and mobile clinics. Recruit health workers from the salt workers' community. Set up a group insurance scheme. Improve and widen credit access. Set up child crèches and schools. Modernise the industry without marginalizing small-scale salt units. Standardise production techniques. Improve power supply. Strengthen infrastructure for storage and transport of salt, with jetties and efficient rail rakes.

The book has been authored by Dr Y S Yadava, Rajdeep Mukherjee and Ram Mundhe.

Report of the Third Governing Council Meeting

The Governing Council, the top advisory and policy-making body of the BOBP-IGO, meets every year to review the IGOs progress and discuss future plans. This publication reports on what happened at the Council's meeting in Malé, Maldives, on May 2 and 3, 2007.

It includes the IGO's report of its work after the previous meeting (the period January 2006-March 2007); a report on the second Technical Advisory Meeting of the IGO held on 5 and 6 February, 2007; and proposed programmes for 2007.

The programmes for 2007 include translation of the technical guidelines on marine fisheries which follow from the Code of Conduct for Responsible Fisheries; training programmes for junior and middle-level fisheries staff on implementation of the Code; setting up of a regional information network; organization of a fisherfolk week; information preparation and dissemination; a regional workshop on resource monitoring, control and surveillance; preparation of a regional management plan for the hilsa and shark fisheries.

Bangladesh will host the next meeting of the Governing Council early in 2008 (subject to approval by the government).

Training Project for Promotion of Community-based Fishery Resource Management by Coastal Small-Scale Fishers in the Philippines Reports of Phase 1 (10-17 July 2006), Phase 2 (10-19 September. 2006) and Phase 3 (11-16 February, 2007).

By universal consent, CBFM (community-based fisheries management) is the surest and the most effective type of fisheries management, since it is undertaken by fishing communities themselves, who perceive it to be in their best interest. Japan is therefore funding CBFM in Asia through a series of country-centred training projects carried out by small-scale fishers and their organizations (fisheries cooperatives, in most cases). Philippines was selected as the first country for this project, covered in Japanese FY 2006 (April 2006-March 2007).

The project is being implemented by the International Cooperative Fisheries Organization (ICFO) of the International Cooperative Alliance (ICA). The project's stated aims: to promote CBFM by small-scale coastal fishers and their organizations; strengthen their activities; and thereby help sustainable production, job opportunities and poverty alleviation. BOBP-IGO is advising ICFO in implementation of the project.

The project has three phases for every country. Under Phase 1, Japanese and other experts visit the selected country to study CBFM and make recommendations; Phase 2 – a team of select fishers visit Japan to study fisheries resource management activities there. Under Phase 3, a concluding project workshop is held in the selected country.

The report of Phase 1 discusses the visit to the Philippines from 10 to 17 July 2006 by four experts: Dr Y S Yadava of the BOBP-IGO; Dr Masahiro Yamao, professor in the graduate school of biosphere science, Hiroshima University, Japan; and Mr Masaki Sato, secretary of the International Cooperative Fisheries Organization, Tokyo, Japan.

The report describes the legal, policy and institutional framework of fisheries management in the Philippines; the expert team's observations on fishery resources.

The report of Phase 2 discusses in detail the 10-day visit by a 12-member Philippines study team to Japan for exposure to its fisheries management System. Participants visited the Tokyo Metropolitan Central Wholesale Market, the fisheries division of the Okinawa Prefectural Government for presentations by the staff there, the Okinawa Local Wholesale Fish Market, the Nago Fisheries Cooperative Association, and the Yanbaru Bussan Centre.

The report discusses the participants' observations on how far Japan's fishery management system is applicable to the Philippines. They were impressed by the rules and regulations adopted by fishers themselves about restricting fishing periods, about not catching juveniles, about conserving spawning and breeding areas.
A long tradition of CBFM and the 'fishery rights' provided to FCAs contributed to the success of fishery resource management. The information readily available on commercially important fish stocks also enabled formulation of management options. The Resources Recovery Plan to address resource decline, and the strong political will in Japan, were important factors in Japan's success story with management.

Could a similar system be introduced in the Philippines? There were problems of leadership, governance, values and attitudes, the participants felt. Knowledge of fishery resources had to be strengthened. A practical system to confer fishing rights to fishermen's associations had to be developed. Policies for an open and closed season had to be formulated.

Mangrove plantations had to be promoted, marine protected areas set up, fish aggregating devices promoted, law enforcement by the community encouraged. Some other suggestions: A study covering socio-economics, the concerns of fishers, resource management practices, existing laws, etc; seminars and workshops for training; livelihood projects; auction markets; development of educational materials.

The report of phase 3 discusses the proceedings of a seminar held in the Philippines (in Puerto Princesa city, Palawan) on "Promotion of community-based fishery resource management by coastal small-scale fishers in the Philippines". Forty nine persons from the fisheries co-operative sector and from the government took part. The aim of the seminar was capacity-building of fisheries cooperative leaders.

The Palawan Declaration adopted at the seminar made several recommendations. It urged nationwide adoption by local government units (LGUs) of ordinances now being implemented by the provincial government of Palawan on coastal resource management. It urged upgrading of the Bureau of Fisheries and Aquatic Resources to a Department; technical assistance from the National Mapping Resource Information Authority in demarcating municipal waters that were off-limits to certain commercial fishing boats; technical assistance to fishery cooperatives from the Cooperative Development Authority; special attention on rescue of fishermen lost at sea by the Navy and the Coast Guard of the Philippines.

Recent issues of "Bay of Bengal News"

March 2006: A special package on improving the safety and health of fishers, based on the deliberations of IFISH-3 (the Third International Conference on Fishing Industry Safety and Health) at Mahabalipuram near Chennai from February 1 to 4, 2006, and on a post-tsunami workshop at the same venue from February 6 to 7, 2006.

June 2006: A special issue on "25 years of ***Bay of Bengal News***, a success story in development journalism," with articles and reader responses recalling the best in content, photography and visuals from 80 issues of BBN.

September 2006: A miscellany of articles, papers and reviews. Editorial on fishery resource

challenges. An interview with Mr Ichiro Nomura, Assistant Director-General for Fisheries at FAO, Rome. Papers on safety at sea from the IFISH-3 conference and the tsunami workshop. An article on NARA, Sri Lanka. Glimpses into Japan's fish markets. A review of the Marine Fisheries Census for India, 2005.

December 2006-March 2007:
Another diverse issue. The March 2007 meeting of COFI (Committee on Fisheries), Rome. Papers from IFISH-3.

A catchy center-spread about the posters on the Code of Conduct for Responsible Fisheries. Articles on the Fishery Survey of India, Mumbai, and the Bangladesh Fisheries Research Institute, Mymensingh, Bangladesh. A summary of FAO's annual publication SOFIA (the State of World Fisheries and Aquaculture) for 2006.

Posters on the Code of Conduct for Responsible Fisheries:

A thousand copies each have been printed of a dozen eye-catching posters that focus on the Code of Conduct for Responsible Fisheries. The posters carry pithy concise text and imaginative sketches. (See *Bay of Bengal News*, December 2006-March 2007).

The Code of Conduct – in regional languages

Materials on the CCRF have to be produced in the vernacular so that fishers read and absorb them – and put what they read into practice.

The BOBP-IGO organized translations in Tamil of the "Technical Guidelines" relating to the Code of Conduct – which contain advice and explanations about the code dealing with fishing craft, fishing gear, aquaculture, etc. A set of 10 "Technical Guidelines and Plans of Action on Marine Fisheries" in Tamil have been produced. Many of them were handed over to fishers and to the Department of Fisheries, Tamil Nadu, at a one-day workshop on the Code held recently in Chennai.

Likewise, a simple 16-page version of the Code has been organized and printed in Bengali and Marathi. Copies were sent for dissemination to the Director of Fisheries, West Bengal, and the Director of Fisheries, Maharashtra.

Video films on the tsunami and on India's salt workers

Two recent video films prepared by the BOBP-IGO deal with the conditions of salt workers in India, and tsunami rehabilitation (the latter film focuses mainly on India and Sri Lanka).

The half-hour film on salt workers, titled "75 years after Dandi: India's salt workers look for their place in the sun," takes a historical look at the salt industry, and discusses the activities and conditions of salt workers. It contains interviews with salt workers and managers and recommendations for the industry.

The film on the tsunami briefly describes its havoc and discusses the problems and challenges of rehabilitation. Officials from the region, FAO experts and fishers are interviewed about action needed.

Calendars – 2006 and 2007

How do children with an artistic bent react to the tsunami? The BOBP-IGO held art contests for school children in four centers of Tamil Nadu, also in Sri Lanka and Maldives. These were described in ***Bay of Bengal News*** (September and December 2005). A selection of these beautiful paintings adorned the unique 2006 calendar. Several organisations/ agencies sponsored the production of this calendar.

The Code of Conduct for Responsible Fisheries is the theme of the 2007 calendar. It contains brief text and sketches in colour. The calendar was sponsored jointly by the Central Institute of Fisheries Education, Mumbai; the National Fisheries Development Board, Hyderabad; and the BOBP.

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation(BOBP-IGO).The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

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Global warming

The heat is on fish, fishers and fisheries

Fisheries will be severely
impacted by global warming.
llions of livelihoods will be threatened
and food supplies will be affected.
Climate change is a global issue
that requires global action.
This issue of BBN initiates a series of
articles on global warming and
its impact on fisheries in the region.

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Global Warming

The heat is on fish, fishers and fisheries

Global warming is no longer a prophecy, it's happening. Its impact on fisheries, which is already under pressure, can be severe. The world's leaders, policy-makers and scientists need to think coolly on one of the hottest issues of today, and follow up with action – fast!

Is the globe really warming? Indeed, yes! The skeptics have been silenced. Signals, facts and trends offer irrefutable evidence of an ominous phenomenon. NASA scientists say that of the 20 hottest years on record, 19 occurred in the 1980s or later. 2005 was one of the hottest years in more than a century.

The earth has a fever, said Mr Al Gore, in his lecture while accepting the Nobel peace award for his work on global warming (jointly with Dr R K Pachauri, who heads the UN Inter-governmental Panel on Climate Change).

Disasters have been striking everywhere – droughts, heat waves, storms, floods, fires, massive glacial melts. Scientists have been predicting this for some time – that man will have to pay for decimating forests and plundering the world's resources; for pumping greenhouse gases into the atmosphere, trapping the heat that flows in from the sun and raising global temperatures.

But carbon dioxide is colourless, odourless, tasteless, as Mr Gore pointed out. Climate change has been impacting our land and marine ecosystems for decades, but we didn't see the effects. Now we see it everywhere, and with regularity. Mr Gore also quoted an apocalyptic line from poet Robert Frost: "Some say the world will end in fire; some say in ice … Either will suffice."

Basics of global warming

Global warming is a term that describes the gradual increase in the earth's temperature. Coal-burning power plants, car exhausts, factory smokestacks, and other waste vents of the human environment give off about 23 billion tonnes of carbon dioxide and other 'greenhouse gases' into the Earth's atmosphere each year. The atmospheric concentration of CO_2 has increased by 31 percent above pre-industrial levels since 1750. This is far higher than at any time during the last 420 000 years, the period for which reliable data has been extracted from ice cores. Temperatures are expected to rise 1.4-5.8°C more by the end of the century.

It is the 'greenhouse effect' caused by human-generated CO_2, particularly during the last 50 years that has accentuated global warming.

This has caused sea levels to rise. Possible outcomes: floods, coastal erosion, impact on agriculture and fisheries (and thereby on food security), species extinction, spread of vector-borne diseases, loss of biodiversity.

Climate change and fisheries

What is the impact of global warming ***specifically*** on fisheries? There has been an assortment of studies and papers from many places, but a sustained and passionate campaign has been pursued by the World Wide Fund for Nature (WWF), and ***Bay of Bengal News*** has no hesitation in quoting and citing from WWF reports and investigations.

First, about resources, fish production and fish behaviour. WWF says the world's oceans, lakes and rivers harbour at least 27 000 known species. Fish are a cornerstone of global biodiversity. 132 million metric tonnes of fish are captured or raised each year, and more than 75 percent of this catch is eaten directly by people.

Worldwide, marine and freshwater fisheries generate over US$130 billion annually, employ at least 200 million people, and feed billions of people who rely on fish as their primary source of protein.

But the global warming of rivers and lakes threatens fish stocks already under pressure from overfishing, pollution and habitat loss, WWF says. "The decline in fish catch could devastate human populations, particularly in poorer countries that rely on fish for protein."

WWF says that fish are more sensitive to temperature than many animals because they cannot maintain a constant body temperature like humans. Higher temperatures reduce oxygen levels of fish, stunt growth, reduce food supplies. They can force fish to seek cooler waters which are alien to them. WWF estimates that 76 percent of the world's fisheries are already fished to their limit. Even slight changes in temperature can force economically important species to move their feeding and breeding grounds, hurting local, small-scale fishing activity most.

Fish, fisheries and global warming – Some other reports, some other phenomena from the Bay of Bengal region

Several global studies name India as one of those particularly vulnerable to global warming. In fact, a 1995 study by the Tata Energy Research Institute and the Ministry of Environment and Forests said that one meter sea level rise could displace 7.1 million people – including all coastal fishing communities. Yet, climate change does not seem to be a priority research area in India.

Scientific studies show that some of the commercially viable marine fish species in India are adapting to climate change. A study conducted by the Central Marine Fisheries Research Institute, Kochi reveals that highly popular oil sardines have moved to new geographical zones because of sea warming. Essentially a tropical species, oil sardines have moved from the south to the north-west and north-east coasts of India.

Other commercially important species have come up with equally interesting strategies for survival. Species like the Indian mackerel have gone down to different depths, and have been caught by bottom trawlers.

Take species like threadfin beam, off the coast of Chennai. Peak spawning months are now the colder months. And off the Mangalore coast on the southwest, the colder months are the season of abundance for copepods.

What's the inference? Adaptable species may be able to adjust to the challenge of temperature rise by modifying their behaviour. But the more vulnerable groups such as corals are in peril. Extensive coral bleaching was reported from the Gulf of Mannar, the Andaman and Lakshadweep seas when the sea temperature was 31° C or more in 1988 and 2002. The intensity of bleaching was proportional to the temperature.

False trevally (*Lactarius lactarius*) is an economically and culturally important fish in India, says WWF. It ranks as one of the most preferred, high-quality fish in the Gulf of Mannar region. But increased water temperatures and decreased rain because of global warming have led to a drastic decline of the fishery over the last few years.

What will be the distribution and migration patterns of oceanic tuna as the global seas warm up? The sex

of sea turtles is critically determined by the soil temperature at which the embryo develops. Prevailing temperatures above 28°C produces only females. Is the massive intrusion of puffer fish and medusae into the Indian coastal waters in recent years a fallout of climate change?

In Sri Lanka, the National Aquatic Resources Research and Development Agency (NARA) says that most sensitive habitats in the country are in different degrees of degradation owing to a combination of human activity and climatic change. Resulting problems (some already manifest, some predicted): resource decline, enhanced erosion, ecosystem changes such as conversion of brackish water into hypersaline water, damage to historical, religious and cultural sites, loss of beaches and tourism revenue, closing of river mouths, greater pollution (see detailed report on pp. 18-23).

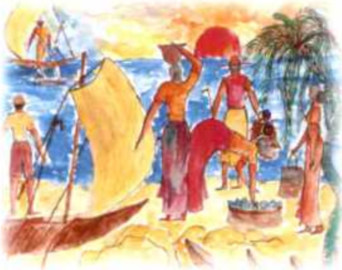
Global warming can aggravate and accentuate problems caused by overfishing, such as loss of biodiversity. This should be a worry for countries who are not adjusting their fleet capacity according to the harvestable potential in their marine waters.

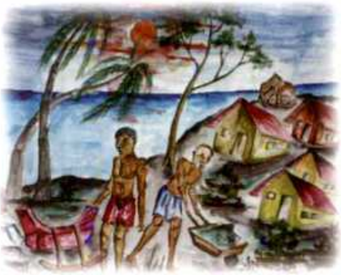
Conclusion

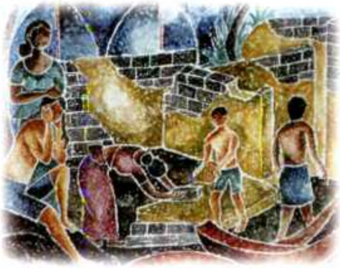
WWF seeks to limit global warming of average global temperature to below 2°C (3.6°F) over pre-industrial levels. That's the threshold at which climate change impacts would become unmanageable for nature and people.

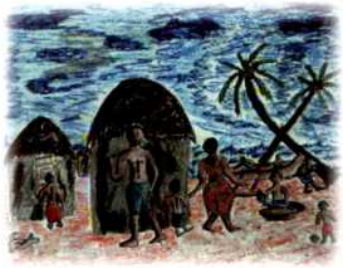
Industrialized countries must cut their CO_2 emissions as obliged under the Kyoto Protocol. They must all agree to much more serious emission reductions in the next period, after 2012. To stay well below the 2°C danger threshold they must reduce their emissions by 60-80 percent.

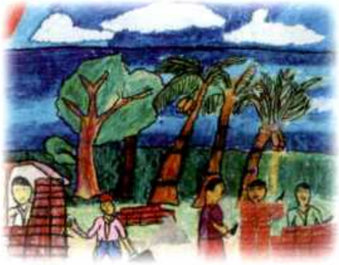
"Rapidly industrializing countries too need to lower their emissions while meeting their development goals by 'leapfrogging' into clean and efficient technologies."

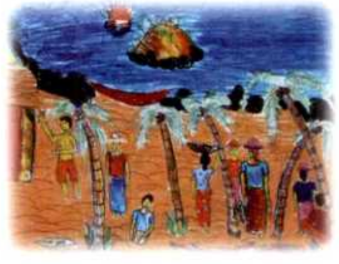












Mr Al Gore propagates a carbon tax. "We need to put a price on carbon – with a CO_2 tax that is then rebated back to the people, progressively in ways that shift the burden of taxation from employment to pollution. This is by far the most effective and simplest way to accelerate solutions to this crisis."

The single largest source of man-made CO_2 is electricity generation, accounting for 37 percent of worldwide CO_2 emissions. The first step to move to a clean energy future is to clean up the power sector, says WWF. It urges the coal-burning power sector to cut climate pollution and aim at a major switch to clean power.

"Comprehensive strategies to build resistance and resilience to climate change impacts need to be developed – for threatened communities as well as for nature reserves."

"Unless governments slow the rate and extent of climate change we're all going to feel like fish out of water," says Stephan Singer, Head of WWF's European Climate and Energy Policy Unit.

The WWF calls for responsible fisheries management and networks of Marine Protected Areas to combat both overfishing and global warming.

"The world needs an alliance," Mr Al Gore said in his Nobel acceptance speech. And Dr R K Pachauri made a similar plea in his Nobel lecture. He referred to the ideal of ***Vasudeva kutumbakam*** ('The world is one family'.)

Al Gore said "We, the human species, are confronting a planetary emergency. But there is hopeful news as well: we have the ability to solve this crisis and avoid the worst – though not all – of its consequences, if we act boldly, decisively and quickly."

– Y S Yadava

Paintings by school children in India, Maldives and Sri Lanka depicting post-tsunami reconstruction.

What Safety Hazards Do You Need to Look for on your Commercial Fishing Vessel?

Alan Davis[*]

This paper describes a detailed safety inspection programme that is employed aboard several large vessels in Alaskan waters. The inspection process focuses on prevention of injuries to workers both above and below decks. The programme identifies risk factors concerning possible injuries to fish processor workers. It tries to find ways to eliminate or mitigate these factors.

Fish processor workers are exposed to many hazards. These include:

- deck hazards such as tools, oxyacetylene use and welding fume exposure, chemicals, worn gear and safety equipment;
- factory hazards and risk factors for musculo-skeletal disorders, including unguarded points, chemicals, personal protection equipment, lifting issues, ergonomics;
- freezer hazards, including unguarded points, clothing, lifting issues, ergonomics;
- offloading hazards, including cargo gear, unguarded points, overhead hazards, safety rails or lines and lack of use of hard hats;
- cargo gear and handling hazards, including inadequate inspection records, crane certifications, crane wires, control labels, worn lifting gear; exposure to hazardous chemicals; and
- safety risks in living quarters, including inadequate use of smoke detectors, cigarette burns, overloaded circuits and exposed wiring.

The programme uses a methodical and detailed safety inspection process to minimize risk factors.

What Safety Hazards do you need to look for on your Commercial Fishing Vessel?

Before safety policies can be written, before safety training can be designed, and before risks can be identified, current conditions and issues must be measured or assessed. Employees must recognize that the management is committed to improving safety. The best way to accomplish this is to perform safety inspections and make OBVIOUS improvements based on the safety inspections. This challenge is magnified in commercial fishing, where generations of 'We have ALWAYS done it this way' have built up.

When I was first asked to explain my safety inspection process, I must admit to being a little stumped. Like many safety professionals, much of what I look for is in my head, not on a checklist. I try to imagine if someone could be injured or made ill by the conditions I am observing. Some professionals refer to this as 'Safety Eyes'. Our challenge now is to open your 'Safety Eyes'.

Inspection equipment

Video or digital camera: Frequently when I'm doing an inspection, even on a vessel I am familiar with, I see hazards but it's hard to describe their location. With a video camera, I can tape the hazard and then show it to the vessel management. The tape also serves as a springboard for problem-solving discussion.

Micro Cassette Recorder: Tape Measures and Voltage Detectors can be very useful at times…and usually are most needed when they are not with you.

Inspection Issues: Machine Guarding is a huge issue in commercial fishing, but is frequently not seen as the biggest

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[*] *This article is edited and abridged from a paper presented at the Third International Conference on Fishing Industry Safety and Health (IFISH-3) held in Mahabalipuram from February 1 through 6, 2006. For the full version of the paper, write to BOBP-IGO. The author is Safety & Compliance Manager, American Seafoods Company, 2025 First Ave. Suite 900, Seattle, WA 98121, 206-256-2677.*

hazard. This is interesting since everyone in the commercial fishing industry knows someone who has lost a finger or an arm in a piece of processing equipment.

In 1996, I interviewed a Baader Technician in Dutch Harbor who had lost four fingers of his right hand including the thumb. His response was "That's Fishing". Fortunately the industry has come a long way since then.

A review of OSHA regulations gives room for interpretation.

OSHA 1910.212(a)(5) : Exposure of blades. When the periphery of the blades of a fan is less than seven feet above the floor or working level, the blades shall be guarded. Now does that mean if a fan or a belt is eight feet off of the floor, it is safe? NO! Plenty of people in today's work force can reach that high. And people are always climbing a ladder or other structure to reach something they need to work on…so GUARD IT.

There isn't room here to describe every situation on a commercial fishing vessel that requires guarding. So a few general conditions:

Blades: The modern factory processor has LOTS of whirling rotating blades. Guard them AND make sure that machines cannot be activated during servicing.

Belts: Both drive belts and product feed belts need to be covered or designed in such a way that crew cannot get caught in them.

Conveyor Belts: Conveyors of all types are used to move product from one place to another. Guidelines for guarding them can be vague, but be aware that transitions can suck people and product in and do extensive damage.

Shafts: Rotating shafts need to be guarded in order to prevent clothing or hair from getting wrapped around them, even if the shaft is open ended.

Fall Protection: Fall Protection issues are one of the greatest risks in commercial fishing. Open hatches, elevated surfaces, and open decks all pose significant hazards. OSHA regulations require that anyone exposed to a possible fall of 4 feet or more be protected, either by railings or by a fall arrest system.

A study in ***Climbing*** magazine many years ago gave the following statistics; a fall of four feet means 20 percent chance of a broken bone; a fall of 10 feet means 80 percent chance of a broken bone AND a 20 percent chance of a spinal injury. Fall 20 feet, and they are not sure if it is the broken bones or the spinal injury that killed you.

Railings: Railings are the best form of protection around deck openings. Railings can be made of rope or chain, but in all cases railing must be capable of withstanding a load of at least 200 pounds, applied in any direction at any point on the top rail. (200 lbs is a bit light considering the size of some crew members).

Slips and fall: Perhaps the most common injury in commercial fishing is caused by slipping or tripping and falling onto the walking surface. Are your decks slippery? Does your house floor get the right kind of wax? Is your crew wearing the correct footwear? Do your showers have anti slip mats inside them and outside of them? Are your stair treads too short for a human foot or are they worn smooth?

Chemicals: There are numerous chemicals used in the commercial fishing industry and since storage space is at a premium, many chemicals are in concentrated form.

MSDS: Material Safety Data Sheets (MSDS) are required by US law to be provided by every chemical manufacturer. Every employer is required to maintain up to date MSDS for every chemical they have in their facility. MSDS contain information like Chemical Content, Health Hazards, Environmental Hazards, Physical Hazards, Permissible Exposure Limits, Safety and Personal Protection Equipment Requirements, Emergency Contact Numbers, and First Aid Measures.

Labelling: Labelling is a key requirement for all chemicals being used on a vessel. All chemical containers, including those used only for a short duration, should be clearly labeled with the name of the chemical, the hazards associated with the chemical, and the personal protective equipment that should be used when working with the chemical.

Storage: Storage space is always at a premium on ocean-going vessels. Chemical storage is a constant problem. Great care must be utilized to make sure that incompatible chemicals are not stored together. There are many chemicals that should not be exposed to water or flame. A few common mistakes:

- **Acids or Caustics and Oils** – Mix these and you may get a fire.
- **Acids and Caustics** – Combined improperly, they can react and produce intense heat or an explosion.
- **Chlorinated products and Ammonia Products** – A common Galley or House issue, this combination can produce a cloud of chlorine gas.

Personal Protection Equipment: Personal Protection Equipment (PPE) encompasses a wide range of products that represent the last line of defense in preventing illness and injury. When conducting an inspection make sure to observe crew members closely. Are they using the proper PPE? Are they using it properly?

Steel Toed Boots: Steel Toed Boots are often overlooked or disregarded but can be of great value in preventing work disabling injuries. In the factory, there are motors and tools that when dropped can easily break toes. In the freezer, a 20 kg box of frozen fish hits with the impact of a hammer when dropped.

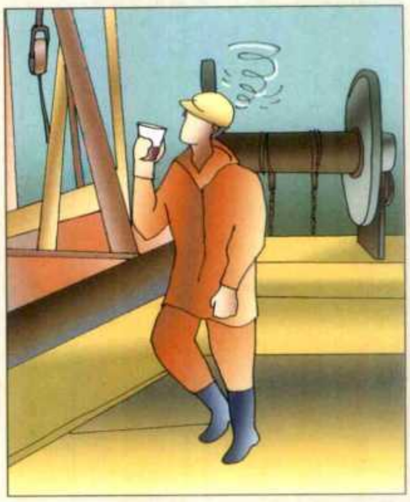
Safety Glasses & Safety Goggles: Safety Glasses should be used in tasks that involve airborne objects and substances presenting a hazard to a crew member's eyes. Commercial fishing has lots of these hazards but has not embraced the idea of safety eyewear. Fish scales, dirt, salt water, fish fins, cleaning chemicals, etc all represent eye hazards in factories. Deckhands have all of these hazards plus metal from punches, wire snags, and snapping lines. Engineers and technicians are working around moving machinery, chemicals, grinding metal, etc.

The argument against safety glasses has always been that they get dirty. This argument is pretty weak when you consider the fact that almost every crew has at least one person that wears prescription glasses. They are able to wear their prescription glasses because they clean them regularly, so everyone else should be able to clean their safety glasses. It should also be noted that all the "dirt" that gets stuck on safety glasses is dirt that was headed toward someone's eyes.

Safety goggles should be worn whenever there is grinding or chemical operations that could result in a splash. Under these conditions, safety glasses do not offer adequate protection. Safety Goggles should be INDIRECTLY ventilated. Many goggles designed for woodworking are directly vented and chemicals might be able to splash through the vents.

Sea Story

A Galley Assistant in the Bering Sea was having trouble cleaning a spot on the galley deck. He went down to the factory and brought a caustic cleaner called 'Super Red' in a paper cup. When the Galley Assistant returned to the galley he was distracted by another problem and sat the paper cup on a table. A thirsty crewman dashing through the galley snatched up the cup and thinking it was 'red punch', swallowed the whole cup in a single gulp. The chemical destroyed his esophagus. According to the story, he had to have a new esophagus made from a piece of his intestine.



Fact or fiction… the story above illustrates the need to use proper containers and labeling... even when it is 'only going to be for a minute'.

Respirators: are used to filter out substances that can cause harm if breathed into the lungs. Some substances found on fishing vessels that should be addressed are: Caustic and Acid Vapors, Welding Fumes, Dusts from grinding, Cutting Fiberglass, Additives, and Refrigerant Gases.

Respirator Clearance Exams: Everyone who wears a respirator is required to have a respirator clearance exam by a medical provider. Is there a medical reason why a person using a respirator should be prohibited from using it? The exam will determine the answer.

Disposable "Dust Masks": There are a variety of "Dust Masks" or nuisance level masks available from a variety of manufacturers, avoid them. If someone needs to wear a "Dust Mask" to feel better, then they should step up the something that can legally be called a respirator.

Full-Face Respirators: Full Face Respirators offer a higher protection factor plus eye protection from vapors and gases. Full Face respirators are also available with welding face shields and many are adaptable for use as airline respirators.

Self Contained Breathing Apparatus (SCBAs): SCBAs are used in situations where the user has to take his or her own air supply into the situation with them. SCBAs have a full-face mask, a regulator and a compressed air bottle. The most widespread use of SCBAs is in fire response and it is important to note that there are MANY SCBAs out there that are not approved for use in fire response.

Deck Hazards

Without a doubt, the deck of a commercial fishing boat is a dangerous place, but the risks can be managed and reduced.

Deck Gear: Wire Rope (cable), Lines, Shackles, Hammerlocks, Winches, Flat Links, Hooks and other gear sustain a tremendous amount of strain during fishing operations. Buy good-quality material. Thoroughly test any new gear before putting it into use.

Flotation: Flotation should be worn on open decks at all times and should definitely be worn during fishing operations. Warm weather or cold, there are enough varieties of flotation devices available to eliminate excuses. The majority of the fatalities in the 2002 Alaskan Fisheries were man-overboard situations – the men concerned WERE NOT wearing flotation devices.

Welding and Cutting Guidelines

Transporting, Moving and Storing Compressed Gas Cylinders:

- Keep valve protection caps in place when not being used. Do not use oil to lubricate caps or valves.
- When cylinders are hoisted, use a pallet or a bottle cage. Do not hoist with a choker sling.
- Move cylinders by tilting and rolling them on their bottom edges. Prevent cylinders from being dropped, struck, or from striking each other.
- Do not use valve protection caps for lifting cylinders.
- Do not pry or hammer on cylinder valve protection caps to loosen them when frozen. Use warm, but not boiling water to thaw the caps loose.
- **Store oxygen cylinders away from acetylene cylinders.** A non-combustible wall at least 5 feet high should be used to separate cylinders.
- Acetylene cylinders shall be kept in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried. **At no time should an acetylene cylinder be stored or moved upside down!**
- Storage rooms for cylinders containing flammable gases shall be well ventilated. Do not place or store cylinders in a location where they would be subject to open flame, hot metal, or other sources of artificial heat. Do not place cylinders containing oxygen or acetylene or other fuel gas in confined spaces.

Wear personal protective equipment. Wear welding gloves, helmet, leather apron, welding chaps, leather shoes, welding goggles, and other personal protective equipment to help prevent weld burns and injury. Do not wear clothing made of synthetic fibers while welding.

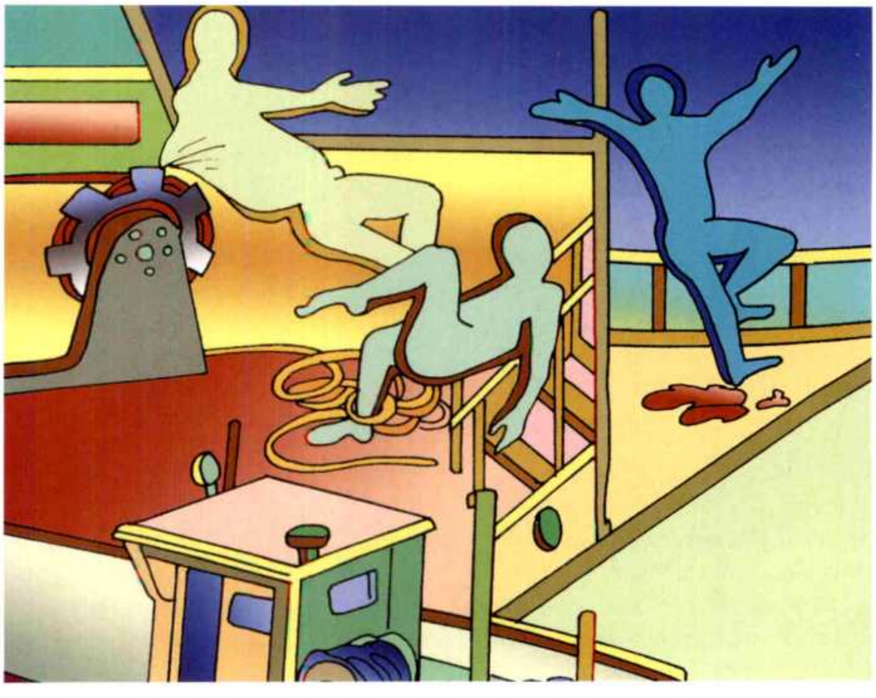
Torches: Clogged torch tip openings should be cleaned with suitable cleaning wires, drills or other devices designed for that purpose. Do not use defective torches. Inspect torches at the beginning of each shift. Light torches with friction lighters or other approved devices, and not with matches or from other hot work.

Welding cables and connectors: All arc welding and cutting cables must be completely insulated and flexible, capable of handling the maximum current requirements of the work in progress.

Factory hazards and risk factors: Musculo-skeletal disorders; ergonomics; lifting issues including unguarded points; chemicals; personal protection equipment; freezer hazards, including unguarded points; clothing.

Off loading hazards, including cargo gear, overhead hazards, safety rails or lines and lack of use of hard hats; cargo gear and handling hazards, including inadequate inspections records, crane certifications, crane wires, control labels, and worn lifting gear.

Safety risks in living quarters: Smoke detectors, cigarette burns, overloaded circuits and exposed wiring, floor surfaces.



Promoting Skilled Manpower for the Fishing Industry: The Contribution of CIFNET

The Central Institute of Fisheries Nautical and Engineering Training, perhaps better known as CIFNET, was set up in Cochin (now Kochi) in 1963 under the Ministry of Agriculture. Its main objective was to develop manpower for ocean-going fishing vessels, on the basis of recommendations made by a government committee on fisheries education. The committee had assessed manpower requirements in fisheries and suggested measures to meet these requirements.

The Institute was initially named Central Institute of Fisheries Operatives. One unit of CIFNET was set up in Chennai in 1968, another in Visakhapatnam in 1981. The Institute was subsequently renamed as Central Institute of Fisheries Nautical and Engineering Training. Courses to train candidates for manning fishing vessels under the Merchant Shipping Act, 1958, are conducted by the Institute regularly in the three centres.

The Institute has a total sanctioned staff strength of 298 at its Cochin headquarters and the two units at Chennai and Visakhapatnam. The other facilities at the three units are as follows:

The Institute is equipped with library facilities, laboratories, an engineering workshop, fishing gear fabrication hall, trainees' hostels, information and publication sections, etc. The Institute's faculty includes doctorates/ post-graduates in engineering, fishing technologists, computer application specialists, masters in nautical science with rich theoretical and practical experience with merchant and naval ships.

Mr G Hassan Manikfan, 57, Director of CIFNET, holds a degree in zoology, a diploma in fisheries science from the CIFE and a diploma in business administration. In his 31-year career with the Ministry of Agriculture, he has served two fisheries organizations – CIFNET and the Integrated Fisheries Project (IFP), Cochin – as well as the Union Territory of Lakshadweep.

Beginning his career as fishing instructor with CIFNET in 1977, Mr Manikfan moved on to the IFP which he served in different capacities – as Assistant Director, as Deputy Director for Experimental Fishing and as Director. He took charge of CIFNET in February 2002; during the first four years of this period, he also held additional charge as Director of IFP. Between 1993 and 1998, he was Director of Fisheries of Lakshadweep.

At IFP, Mr Manikfan helped draw up long-term and short-term strategies for development. Significant contributions were made by IFP during his period to improve marine products development, impart training to the industry in fish processing, and carry out fabrication and repair of fishing gear. He helped reorganise the IFP by transferring various staff to CIFNET and the Fishery Survey of India. At Lakshadweep, Mr Manikfan was responsible as Director of Fisheries for planning and implementation of projects, purchase operations, and coordination between fisheries and other departments.

As Director of CIFNET, Mr Manikfan plans and implements training programmes, formulates policies, liaises with the fishing industry, with various governments and international bodies. He manages fishing vessel operations and organises manpower development for deep-sea fishing vessels. He has helped introduce new courses, conducted a study on the efficacy of LPG as a fuel for outboard motors used by fishermen, and established an engine room simulator for students.

Objectives of CIFNET

- To create trained manpower for the operation of ocean-going fishing vessels. To run infrastructural establishments with technical teachers for manning fishermen training centres attached to maritime states and Union Territories (UTs).
- To conduct studies on fishing craft, gear and equipment. To provide extensive training for advancement in fishing technology aimed at enhancing fishermen's productivity and increasing marine fish production.
- To help developing nations in the South-east Asian, Middle-east

Facilities with CIFNET

Facilities	Headquarters Kochi	Chennai	Visakhapatnam
Total land area (acres)	4.35	1.41	1.035
Building area (sq.mt)	5 730	2 903	3 300
Training Vessels	M V Prashikshani; 34 meter LOA; training in trawling and longlining	MV Skipper; 28.3 meter LOA; training in trawling	M V Skipper III; 28.3 meter LOA; training in trawling

The Technical Divisions of CIFNET and their activities

Technical Division	Activities
Nautical Division	Seamanship & navigation, marine meteorology, chart work, etc.
Fishing Gear Division	Fishing gear material and design, fabrication of fishing techniques, fishery biology section, deck equipment, etc.
Marine Engineering Division	Marine engineering, electrical engineering, electronics & computer applications, hydraulics, refrigeration, etc.
Boatbuilding Division	Fishing, boatbuilding technology, materials, design, construction, installation of engines and accessories, etc.
Maintenance Division	Maintenance and repair of fishing vessels, equipment and machinery, etc.
Training Division	Programming and conduct of various training courses, post-institutional training, examinations, employment guidance, etc.

and African regions to create technical manpower for development of marine fisheries.

- To provide consultancy services in all matters with special reference to technical manpower requirements.

Vision of CIFNET

To impart quality training in order to upgrade skills, prevent obsolescence, and develop a constructive attitude with a focus on competitiveness to meet the changes and challenges of contemporary needs in both fishing and the merchant marine.

Recent achievements of CIFNET

- Introduction of a 4-year Bachelor of Fisheries Science (Nautical Science) degree course approved and affiliated by Cochin University of Science and Technology, Kochi.
- Introduction of 2-year trade courses for Vessel Navigator and Marine Fitter approved by the Director-General of Employment and Training (DGET), Ministry of Labour, New Delhi, affiliated to National Council of Vocational Training (NCVT).
- CIFNET has conducted a study on the efficacy of LPG as fuel on outboard motors used by fishermen in fishing vessels. The project was successfully completed and a report was submitted to the Ministry of Agriculture in 2007.
- Establishment of Engine Room Simulator for the benefit of students of various engineering colleges undergoing short-term training programmes at CIFNET, and students of the Marine Fitter Course at CIFNET.

Contributions of CIFNET

A. On the training front:

Fishing industry: The Institute conducts a Mate Fishing Vessel Course, an Engine Driver Fishing Vessel Course, a Vessel Navigator Course and a Marine Fitter Course for operative personnel for fishing vessels. The Institute provides post-institutional training to help candidates acquire sea services for the competency examinations conducted by Mercantile Marine Department (MMD) – they are eligible for a remission of the sea service requirements prescribed in the Merchant Shipping Act, 1958.

Foreign nationals: The Institute trains foreign nationals, mainly from Africa and Asia, under various bilateral schemes. 124 candidates from Nigeria, Zambia, Tanzania, Ghana, PDR Yemen, Myanmar, Laos, Sri Lanka, Bangladesh, Maldives and Philippines, etc. have been trained so far.

Inter-institutional activities for marine fisheries development: CIFNET is associated with various Central and State Government organizations, the Indian Coast Guard, universities, colleges and the fishing industry. It imparts technical

CIFNET Headquarters at Kochi, Kerala

CIFNET
CENTRAL INSTITUTE

knowledge on marine fisheries development to their representatives.

Training for officials of Government organizations and financial institutions: The Institute regularly conducts trainers' training programmes for officials of the Marine Products Export Development Authority (MPEDA) on marine electronics & equipment, capture fisheries, hygienic handling of catch onboard fishing vessels, etc. The Institute provides refresher courses for in-service certified hands of fishing vessels from institutes like the Fishery Survey of India (FSI), Central Institute of Fisheries Technology (CIFT), etc. These courses update knowledge on nautical science and electronic equipment and prepare candidates appearing for higher-level competency examinations conducted by the MMD.

The Central Institute of Coastal Engineering for Fishery (CICEF) regularly deputes its officials for the training courses on 'Operation of outboard engines and navigation' and 'Nautical and engineering technology'. The institute has also conducted customized courses for officials of financial institutions like NABARD on 'Fish preservation and processing' to acquaint them with the subject.

The Institute is connected with the National Institute of Ocean Technology, National Institute of Oceanography and Department of Ocean Development by way of designing and fabricating suitable fishing gear for experimental operation onboard the research vessels belonging to these organisations.

Training courses for State Directorate of Fisheries and UTs of Lakshadweep: CIFNET has been conducting various short-term training programmes for candidates sponsored by the Fisheries Departments of States and UTs. These include 'Operation of patrol boats'(Orissa), 'Introduction of intermediate craft for pelagic trawling' (Andhra Pradesh) and 'Marine electronics & equipment' (Maharashtra, Orissa, and Goa). The Institute has conducted courses for candidates sponsored by the Lakshadweep Administration and the Lakshadweep Development Corporation. These include 'Shore mechanic's course', 'Junior signal man course' and 'Course on practical trawling operations'.

Training of Coast Guard officers: The Institute has been imparting training in fisheries technology to officers of the Indian Coast Guard since 1984 to acquaint them with fishing activities. The Assistant Commandants undergo this training for a week.

Training courses for college and university students: CIFNET's expertise, training facilities and infrastructure are offered to college and university students. Short-term sandwich training programmes are arranged in subjects like fishing gear, fisheries technology, marine engines, marine refrigeration, marine electrical technology, marine electro technology, marine electronic equipment & power supplies. Students from various vocational institutions, graduate and post graduate students in science and fisheries, and students of engineering colleges, benefit from these specially designed programmes.

Extension activities for the traditional fisheries sector: The Institute makes its expertise available to meet any specific demand for updating / upgradation of new fishing technology. Some of the training programmes organized by CIFNET for traditional fishermen to enhance their fishery activities and uplift their socio-economic status are 'Operation and maintenance of outboard motors', 'Hygienic handling of catch onboard', 'Safety of life at Sea', etc.

B. Contribution to the fishing industry

Location of tuna grounds in the Indian EEZ: Tuna longline fishery was introduced in the early 1980s, and was established after the initial

Foreign Candidates Trained at CIFNET (as on 31.12.2007)

Country	Scheme	Number Trained
Nigeria	FAO Fellowship	15
Philippines	FAO Fellowship TCS Colombo Plan	2 2
Fiji	TCS Colombo Plan	4
Zambia	SCAAP	8
Ghana	FAO Fellowship SCAAP	2 5
Laos	ESCAP	2
Burma	FAO Fellowship TCS Colombo Plan	12 1
PDR Yemen	FAO Fellowship Bilateral	3 15
Tanzania	CFTC	4
Maldives	CFTC ITEC	5 4
Bangladesh	CFTC TCS Colombo Plan	16 1
Kiribati	CFTC	1
Namibia	CFTC	10
Sri Lanka	CFTC ITEC TCS Colombo Plan	10 1 1

SCAAP - Special Commonwealth African Assistance Plan; ESCAP -Economic & Social Commission for Asia and Pacific; CFTC -Commonwealth Fund for Technical Co-operation; ITEC -Indian Technical & Economic Co-operation; TCS - Technical Co-operation Scheme breakthrough around 1986-87. CIFNET undertook a new exploratory tuna longlining programme jointly with the FSI. The training-cum-survey conducted by the institute's training vessel MV Prashikshani during the 1980s helped in locating potential tuna grounds in the Indian EEZ. The institute has also trained personnel required for this sophisticated fishing method.

Selective shrimp trawl fishing: CIFNET in association with the Institute of Marine Research, Bergen, Norway, was identified for the conduct of Selective Shrimp Trawl Fishing operations. The Institute's 28 meter trawler MV Skipper III in the North-eastern coast, carried out the experiment during 1995-96.

Ferro-cement boat construction: CIFNET and FAO conducted a technical co-operation programme on the introduction of ferro-cement as an alternative construction material for fishing vessels. Six such vessels were constructed under this programme by CIFNET. They were later handed over to various fisheries corporations for further operations.

Energy conservation programme: A programme for energy conservation in the Indian fishing fleet was specially undertaken by CIFNET in 1988 under a bilateral agreement signed between India and Norway. Technical tests were carried out on these vessels for hydrodynamic properties and characteristics of propulsion machinery. The findings showed good fuel-saving potential in the Indian fishing fleet through economic operational measures.

LPG project of CIFNET: Considering the importance of alternate fuel, the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture decided to take up a feasibility study on the efficacy of LPG for use on Outboard Motors (OBMs) operated in traditional fisheries. The Department identified CIFNET as the agency to undertake this study. CIFNET took up this project study in November 2006, on a 9.9 HP OBM and a 25 HP OBM respectively at two different centers. The result of the study has been submitted to the Department.

CIFNET Director addressing the trainees

Trainees acquiring practical skills in the Institute's laboratory

Major constraints

CIFNET's facilities are meant to cater to the training requirements of two regular 24-month courses – Mate Fishing Vessel and Engine Driver Fishing Vessel. A number of faculty have been proposed and sanctioned to handle classes for these courses. Many posts have been abolished or surrendered because of various reasons as well as government policy decisions. Now, the staff strength has been reduced drastically because of government curbs on filling up posts earmarked for direct recruitment.

Considering the demand for technically qualified hands in fisheries, the institute has commenced a four-year degree course recognized and affiliated by the Cochin University of Science & Technology during 2005. The certificate courses of 18-month duration have also been upgraded to 24-month courses and approved by DGET, Ministry of Labour, New Delhi and affiliated by NCVT.

Earlier, the total strength of the candidates in regular courses at the three centres was 200. Now the strength has gone up to 272. In addition to these courses, the Institute is conducting short-term training courses for fisheries organizations/ universities/ professional college students/ fishermen, etc. More than 1 000 people are trained every year in the short-term courses. The workload and training efforts have gone up considerably during recent years. The Institute could not add facilities or faculties proportionately to the increase in the training activities. No new posts have been sanctioned for starting the degree course; on the other hand, the staff strength got reduced during the last four years because of general government policy.

Three training vessels presently available with the institute are more than 27 years old and have already outlived useful life. The machinery and equipment onboard these vessels are very old; frequent breakdowns have occurred in all three vessels. It is essential to procure new training vessels complete with equipment to impart practical training to the candidates undergoing regular courses at CIFNET. The practical training onboard fishing vessels is compulsory.

More training institutes have been established in the private sector for developing manpower for merchant shipping. Their training courses lead to CDC (Continuous Discharge Certificate), the document required for employment in merchant ships. These courses attract many candidates because of the job opportunities they provide in shipping. It is necessary for CIFNET to diversify the courses to suit the requirement of modern days.

Lack of proper hostel facilities to accommodate all the candidates undergoing regular courses affects the welfare of students undergoing regular courses. It is therefore necessary to overcome the shortcomings in the area to make the training programmes more efficient and quality-based.

CIFNET has long experience in developing technical manpower for the fishing industry. It has also designed and conducted short-term and long-term courses for fisheries organizations/ universities/ banks/ professional colleges/ fishermen, etc. The Institute has also organized field training programmes for fishermen in fishing villages. The Institute can design the programmes according to the requirement of target groups and sponsoring agencies. More training programmes can be taken up by CIFNET, provided facilities and faculty are upgraded.

Job potential for CIFNET trainees

Candidates who successfully complete the 24-month Mate Fishing Vessel Course at CIFNET can appear for the Mate Fishing Vessel Competency Certificate Examination after acquiring 24 months of sea service working onboard fishing vessels. Candidates who obtain such Competency Certificates can appear for a Skipper Gr. II Competency Certificate – they will need 18 months of sea service after the Mate Certificate Examination or 30 months of sea service towards eligibility for Skipper Gr. I examination.

Similarly, candidates who successfully complete Engine Driver Fishing Vessel Course at CIFNET have to follow it up with 6 months workshop service and 9 months sea service towards eligibility for Engine Driver (FV) Competency Certificate Examination and further 21 months sea service for Engineer (FV) Examination.

As per available information, most CIFNET-trained candidates secure suitable jobs on their own. The Institute is proud that most large fishing vessels in the country are managed/ manned by CIFNET-trained and certificated personnel. Some CIFNET-trained personnel have also obtained jobs in fisheries and allied sectors in African and Middle-east countries.

Future development activities

- Upgradation of the present NCVT trade courses to 3-year diploma courses;
- Acquisition of modern training vessels;
- Construction of a laboratory complex at CIFNET, Kochi;
- Setting up of new IC engines, pneumatic and refrigeration laboratories;
- Setting up a new bio-chemistry and processing laboratory;
- Setting up a working model of a marine power transmission system – CIFNET Visakhapatnam;
- Establishing an experimental hatchery unit – CIFNET Kochi;
- Construction of a new hostel complex – CIFNET Kochi;
- Construction of a swimming pool at CIFNET Kochi; and
- Upgradation of the Simulator Centre by adding GMDSS, navigation and fishing simulation software.

CIFNET Trainees onboard fishing vessel

Financing Fisheries Management in India

Yugraj Singh Yadava

At the expert consultation on low-cost fisheries management strategies held in Georgetown, Guyana in September 2007, a paper was presented on the financing of fisheries management in India. Here is a condensed version of the paper.

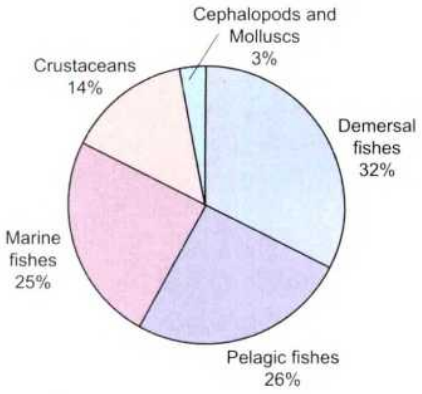
In the mid-1980s, India undertook a series of reforms to minimize state interference in business and liberalize the economy. The New Economic Policy of 1991 marked a clear shift from pro-planning to a pro-market growth model based on the principles of liberalization, privatization and globalization of the economy.

India is now the third largest economy in the world in terms of purchasing power parity (PPP) and the second fastest growing major economy in the world (a GDP growth rate of 9.4 percent for the fiscal year 2006–2007).

Despite industrial development, agriculture is a major economic player. It contributes about 20 percent of the Gross Domestic Product (GDP) and employs about 60 percent of the labour force in the country. (Industry contributes about 26 percent of the GDP and employs about 12 percent of the labour force.). Fisheries is also a major foreign exchange earner, through export of marine products.

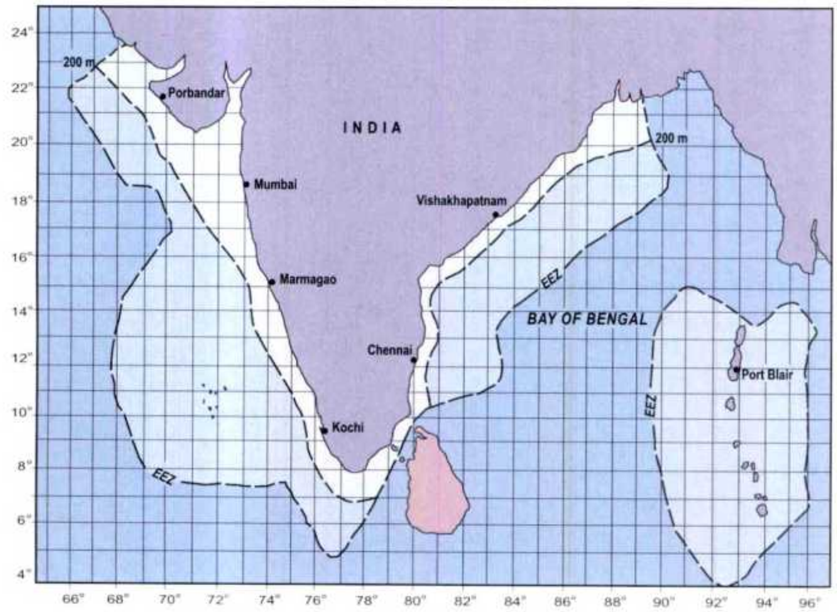
Trends in fish production and catch composition

Fish production in India touched the record of 6.57 million tonnes in 2005-06. Marine fisheries contributed 2.82 million tonnes, inland fisheries 3.75 million metric tonnes.



India's marine waters harbour 1 707 species of fish, of which over hundred species are commercially harvested. There have been considerable variations in catch through the period 1950-2005. More species are being harvested, catch composition has changed, some species have declined. Broadly speaking, during the 1950s and 1960s, Indian oil sardines, natantian decapods, mackerels and Bombay duck constituted the majority (more than one-third) of the landings. But since 1970s, the share of Bombay duck has declined steadily, so have the shares of other dominant species such as clupeids and hair tails. On the other hand, a phenomenal rise

Exclusive Economic Zone of India



occurred in the landings of prawns, shrimps and other marine crustaceans.

Marine fisheries resources

The country has a long coastline of 8 118 kms and an equally large area under estuaries, backwaters and lagoons, etc. The continental shelf area amounts to 5 30 000 sq. kms of which 71 percent area is available in the Arabian Sea (west coast) and the remaining 29 percent in the Bay of Bengal (east coast). After declaration of the Exclusive Economic Zone (EEZ) in 1977, the area available to India is estimated at 2.02 million sq. km, comprising 0.86 million sq. km on the west coast, 0.56 million sq. km on the east coast and 0.60 million sq. km. around the Andaman and Nicobar Islands.

The fish production potential in India as per current estimates is 8.40 million tonnes per annum. Potential yields from inland fisheries and marine fisheries are estimated at 4.50 million tonnes per annum and 3.92 million tonnes per annum respectively. India presently exploits 83 percent of potential yield in inland fisheries and 72 percent of potential in marine fisheries.

Fishing fleet

The marine fishing fleet comprises about 2 80 491 fishing craft of which 2 25 862 are of traditional types (including about 44 578 motorized traditional craft). The mechanized fishing fleet comprises 29 241 trawlers, 983 purse seines, 14 183 gill-netters, 8 862 *dol*-netters and 1 020 other type of boats. As seen by the number of traditional craft and small-mechanized vessels, the major fishing activities are still concentrated in the areas within 0 to 70-80 meter depth zone. As compared to the west coast, concentration of traditional craft (including motorized) is more on the east coast (about 57 % of the total). In the case of mechanized vessels, the trend is reverse. The scale of mechanization is also reflected in the total fish landings of the two coasts.

At the national level, the mechanized sector contributes about 67 percent of the landing. In 1969 it was a mere 20 percent. Motorized sector contributes about 25 percent and the balance 8 to 10 percent is contributed by the traditional crafts. With the advent of mechanization, use of traditional harvesting gear like bag net, cast net, small meshed gill net has declined and more efficient gear like purse seines have became popular.

Allocation of funds to fisheries management

Fisheries management in India is mainly concerned with increasing production both in capture and culture fisheries, R&D support to increase production in a sustainable manner, human resource development, improving the operational efficiency of various schemes, and capacity-building in fisheries.

Until the Seventh Five-Year Plan (1985-1990), the Government was mainly concerned with increasing

Fishing craft operating in the coastal States and Union Territories

Sl. No.	State/ Union Territory	Traditional crafts	Motorized traditional crafts	Mechanized boats	Total
1	Andhra Pradesh	53 853	4 164	8 642	66 659
2	Goa	1 094	1 100	1092	3 286
3	Gujarat	9 222	5 391	11 372	25 985
4	Karnataka	19 292	3 452	2 866	25 610
5	Kerala	28 456	17 362	4 206	50 024
6	Maharashtra	10 256	286	8 899	19 441
7	Orissa	10 993	2 640	1 276	15 854
8	Tamil Nadu	33 945	8 592	9 896	52 433
9	West Bengal	4 850	270	3 362	8 482
10	Andaman & Nicobar Islands	1 180	160	230	1 570
11	Daman and Diu	252	350	805	1 407
12	Lakshadweep	594	306	478	1 378
13	Pondicherry	7 297	505	560	8 362
	Total	**181 284**	**44 578**	**53 684**	**280 491**

Total includes 810 FRP Catamarans and 135 Beach Landing Crafts

Source: Handbook of Fisheries Statistics-2004, Government of India.

fish production and promoting capitalization of the fishing fleet. It was only during the Eighth Five-Year Plan (1992- 1997) that fisheries management figured in the Plan budget.

Management measures being considered include a ban on fishing during the monsoon, standardization of mesh sizes in different categories of fishing gear and conservation of aquatic bio-diversity in accordance with the FAO Code of Conduct for Responsible Fisheries.

Expenditure on fisheries management can be classified into expenditure on various components of management (research, capacity building and human resource development, etc) and allocation of funds to the States/ Union Territories.

Both the Central and State Governments finance fisheries. Plan outlays for fisheries have gone up from Rs 19 600 million (1951-56) to Rs 19 688 150 million (2002-07).

State Government funding is mainly for fisher welfare. Some schemes are funded entirely by State Governments; and for some centrally sponsored schemes, State Governments provide 50 percent of the outlay.

Non-government funding for fisheries management activities

Non-government sources of funds for fisheries in India are mainly external – various regional and inter-governmental organizations, and the UN system (agencies such as the FAO, UNDP, IMO, World Bank).

Institutional finance: the National Bank for Agriculture and Rural Development (NABARD) refinances bank credit for fisheries. Deep-sea fishing and aquaculture have been funded by institutions such as the Industrial Finance Corporation of India, the Industrial Development Bank of India, the Shipping Credit and Investment Company of India, State Finance Corporations and the National Co-operative Development Corporation.

Credit support from financial institutes is available for almost all fisheries activities and for infrastructure creation. But middlemen, merchants and occasional moneylenders continue to play an important role. Liberalization of banking may mean more public finance for fisheries.

Costs of fisheries management

Costs related to MCS and conflict management are said to have increased, although no specific data are available. The government believes that the money directed at MCS is inadequate. The mechanism of cost-sharing for fisheries management is minimal. License fees are levied in the mechanized sector, but fees are low, so are penalties for offences. These sources of revenue are insignificant in relation to the cost of resource management.

Fishermen cooperative societies are exempted from income tax. Two possible explanations are that farmers are exempted from income tax; and that the cost of tax collection in a highly disaggregated sector like fisheries is too high in relation to the possible revenue.

Seafood exporters were exempted from income tax until recently. Now they are charged a fee of 0.3 percent of the FOB value of seafood exports (the fee was 0.5 percent earlier).

Packing fish in ice at Vizag Fishing Harbour, Andhra Pradesh, India

The collected tax is used to finance the MPEDA, and currently stands at about US$ 4 million per annum.

At present, the governments of various coastal States/ UTs license only mechanized fishing vessels. The system of licensing must be extended to motorized and non-motorized craft as well. Licensing will enable an inventory of all categories of fishing vessels. New vessels should be permitted only to replace vessels of equal size and capacity. The priority of licensing should shift from revenue-earning to regulating the number and type of fishing vessels. Licensing will also enable better implementation of sea safety norms in small-scale fishing vessels.

The ability-to-pay mechanism

In theory, an ability-to-pay mechanism is possible in marine fisheries. But politics and the politics of fisher unions are hurdles. A majority of the fishers are small-scale and poor. Non- payment of rent is common, and there is no mechanism in place to penalize defaulters. Result: very little rent accrues from the users of landing and berthing facilities. Because of political compulsions, it is becoming difficult for management bodies to rationalize the fee and fund better maintenance and upkeep of infrastructure facilities such as fishing harbours and fish landing centres.

The role of private players in fisheries management is limited. The Tenth Five-Year Plan document emphasises the importance of private/ public partnership to strengthen the infrastructure, diversify fisheries and aquaculture, and enhance fish production and productivity. Greater investment is also needed to strengthen research and training, post-harvest and marketing structures. More Minor Fishing Harbours and Fish Landing Centres need to be set up.

The private money lender can be a significant player in fisheries management, though he finds no place in management policy. The private moneylender acts as a cushion for fishers and fish farmers during lean periods. Since timely institutional credit is not available, fishers depend mostly on private moneylenders – who serve as inputs suppliers in aquaculture and as wholesale buyers in capture fishery.

In conclusion, the plus points of management in India lie in the modernization of fisheries, particularly aquaculture, in increased fish production (both from inland and capture fisheries and aquaculture), and in greater export earnings. Technology is being made use of for fisheries management; and transaction costs have been going up for conflict resolution, MCS and safety at sea, especially in relation to small-scale fishers.

But there are questions over the sustainability of both capture and culture fisheries in India. Marine capture fisheries confronts the issues of open access and overfishing. Small-scale fishers have still to be pulled out of the poverty trap. Livelihoods are being threatened in many fishing communities along the coastline. The management is largely top-down, although a participatory approach to management is often discussed.

The challenge of today lies in optimal utilisation of resources and in strategies like co-management which can increase the role of fishers and other stakeholders in day-to-day management of fisheries.

Climate Change Impact on Coastal Resources in Sri Lanka*

Sea warming and sea level rise may impact strongly on coastal fisheries and agriculture in Sri Lanka, aggravating the poverty of coastal communities. Sri Lanka cannot prevent climate change, but can adopt mitigation/ preparedness strategies. This study, carried out by the National Aquatic Resources Research and Development Agency (NARA) discusses how climate change will impact on coastal resources. It also identifies several activities to overcome the impact of climate change on fisheries and agriculture – such as culture of seaweed, oyster farming, crab fattening, artificial production of marine ornamental fish, value addition to agriculture and fisheries products, and use of fish aggregating devices.

The coastline of Sri Lanka is about 1 760 km long, the third longest in South Asia. A total of 4.6 million people (about one quarter of the population), lives along the coast. Sri Lanka's coastline exhibits considerable geographic diversity; bays, long sandy beaches, lagoons, dunes, bar built lagoons and estuaries. It supports a unique ecosystem and serves as base for sensitive habitats such as mangroves, coral reef beds and seaweed beds. The coastal zone is extremely sensitive to changes in climate. It is prone to disasters but also acts as a buffer zone against disaster. Fishery is the major livelihood in the coastal zone. Agriculture is important as well.

Coastal fisheries accounts for almost three quarters of the total fisheries production in Sri Lanka. The fishery sector contributed about 1.2 percent of the GDP in 2006 and continues to be an important source of foreign exchange. In 2006, fishery export amounted to 138 million US $. Prawns, mainly from culture (80%) accounted for 14 percent of the export value from fisheries products. The ornamental fish industry based on coral reefs is rapidly expanding since the early 1990s. The coastal zone supports infrastructure for coastal and offshore fisheries, tourism, recreation, and navigation.

Sea level rise has intensified coastal erosion, siltation of estuaries,

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** This article is based on a report provided by Dr K Arulanathan, Head, Oceanography, National Aquatic Resources Research and Development Agency, Crow Island, Colombo-15, Sri Lanka. Dr Arulanathan can be contacted at arul@nara.ac.lk* saltwater intrusion into rivers and salination of coastal plains. Increased siltation and reduced fresh water discharge into the coastal zone have enhanced sedimentation on the coastal zone. Anthropogenic activities – such as overexploitation of resources, emission of green house gases, deforestation, ad hoc irrigation, land use changes, sand mining – accelerate the slow processes of climatic change.

A Coastal Zone Management Plan was introduced in Sri Lanka in 1997 to integrate development activities and protect the coastal environment and resources. The Plan has focused primarily on the vulnerability of the coast to erosion. But vulnerability to climate change has not received adequate attention.

Climate system and its components

Climate is an outcome of the exchange of heat and mass between various components of nature. Climate evolves in time under the influence of its own internal dynamics; also by interaction among various components of nature and their physical, chemical and biological properties. The natural components are – atmosphere, hydrosphere (ocean), cryosphere (ice sheets), lithosphere (land) and biosphere. The system is also influenced by external forces such as volcanic eruptions, solar variations, composition change of the atmosphere, land-use change.

Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. In general, 'climate change' is attributable to human activities altering the atmospheric composition, and 'climate variability' attributable to natural causes.

Natural processes and their impacts on climate

Climate change can be classified into 'forcings' and 'feedbacks'. A climate forcing is an energy imbalance imposed on the climate system by natural processes (such as changes in solar energy output, volcanic emissions) and anthropogenic effect (such as emissions of greenhouse gases, aerosols, and their precursors). A climate feedback is an internal climate process that amplifies or dampens the climate response to an initial forcing.

Various hypotheses have been formulated for long-term climate change. But no generally accepted explanation fits all observed characteristics. Some of the hypotheses are:

- Change in Earth's orbit, thus variations in solar radiation (20, 40 & 100 kyr);
- Isostatic readjustments;
- Transition between steady states;
- Non-linear transfer from 20 & 40 kyr;
- Slow CO_2 feedback; and
- Inter-planetary dust.

Over the last 400 000 years the Earth's climate has been unstable, with very significant temperature changes. These changes suggest that climate may be quite sensitive to internal or external climate forcings and feedbacks. But during the last 10 000 years, temperatures have been less varying. Based on the incomplete evidence available, it is unlikely that global mean temperatures have varied by more than 1°C in a century during this period. Records indicate a strong correlation between carbon dioxide content in the atmosphere and temperature.

Geological data indicates that global average sea level may have risen at an average rate of about 0.5 mm/ yr over the last 6 000 years. At an average rate of 0.1 to 0.2 mm/ yr over the last 3 000 years, global warming will lead to a sea level rise of 110 to 880 mm.

Anthropogenic impacts on the climate

Human activities add to nature's influences on climate. Human impacts on the climate system include increasing concentrations of atmospheric greenhouse gases (*e.g.*, carbon dioxide, chlorofluorocarbons and their substitutes, methane, nitrous oxide, etc), air pollution, increasing concentrations of airborne particles, and land alteration.

Since the beginning of the industrial revolution, atmospheric concentrations of carbon dioxide have increased nearly 30 percent, methane concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15 percent. These increases have enhanced the heat-trapping capability of the earth's atmosphere.

While some gases, such as carbon dioxide and methane in the upper atmosphere, create the greenhouse effect associated with global warming, other pollutants, such as sulfur dioxide and nitrogen oxides in the lower atmosphere cool the earth's surface by reflecting sunlight.

Coastal bio-physical features and resources

Sri Lanka's coastal region comprises 74 administrative divisions. They contain about:

- 23 percent of the islands 65 610 km^2 land area, 25 percent of the population, including 65 percent of the total urban population, 70 percent of the tourist hotels, 62 percent of the industrial units and 285 sq. km of lands gazetted as municipal and urban lands;
- Habitats that are vital for ecological functions, maintaining biodiversity and economic activities, especially the coastal and marine fishery; and
- A large number of high priority archeological, historical, religious and cultural sites, as well as scenic and recreational sites.

The coastal fishery accounts for about 68 percent of the coastal and marine fishery, which together provides 88 percent of the total fish production in Sri Lanka. Agricultural lands comprise around

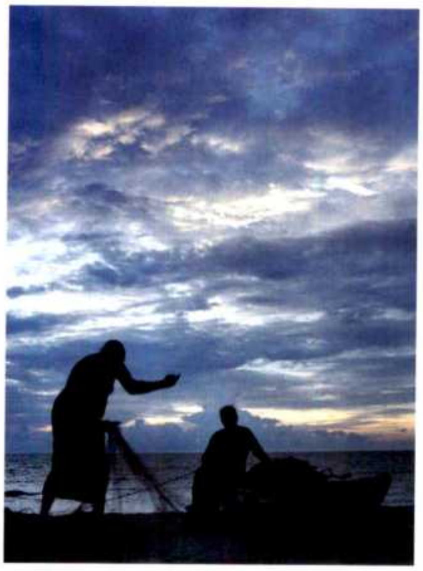
17 percent of the coastal zone, while home gardens comprise about 20 percent.

Fisheries and aquaculture: The Sri Lankan fishery is dominated by coastal fishing. Coastal fisheries are broadly defined as fishing activities taking place in the area of the continental shelf or the fisheries conducted within a day (24 hrs). However, in general, fishing activities within the area of the sea extending up to 40 km from the coast are considered as the coastal fishery. At present, coastal fisheries accounts for 48 percent of the total fish production (with about 121 360 metric tonnes) while offshore and inland and aquaculture contribute 38 and 14 percent respectively.

More than 1 337 fishing villages are scattered along the coastline of Sri Lanka and some 128 400 households live in these villages. The fisheries directly employ over 143 150 fishermen. It is estimated that around 15 percent of the marine landings are from reef fisheries.

The coastal zone is heavily used for fish landings. Sri Lanka has some 752 minor fish landing sites scattered along the coast besides 10 main fishery harbours and 19 anchorages. The total marine fishing family population amounts to 626 940. It is estimated that more than a million people from the coastal community depend on fisheries for their livelihood. The fisheries sector contributes more than SLR 14 440 million foreign exchange through export of marine and aquaculture products.

Mineral resources: Coastal areas contain several types of quaternary deposits among which are sands, sandstone, quartz, gravels, red earth and inland coral deposits. Among the important minerals in coastal areas are heavy mineral sands (Kokilai to Pulmodi, Kuderamali, Trincomalee, Beruwala and Hambantota), Silica sand (Madampe-Nattandia, Vallipuram), salt (Puttalam, Mannar, Elephant Pass and Hambantota). Miocene limestone (Puttalam, Mullithevu, Jaffna Peninsula), iron ore (Ratgama), and moonstones (Ambalangoda), peat (Muthurajawela). Possible resources include placer deposits, petroleum, gas and shale. As of 1997, US $ 330 million worth of heavy mineral placer deposits were identified on the shallow waters off Beruwala.



Sensitive habitats: Several species of marine mammals and sea turtles and also large numbers of wader birds frequent the coastal lagoons of Sri Lanka. Nearly 50 seabird species have been recorded on the west coast of the Island.

Mangroves cover the near-shore areas of many coastal water bodies. They stabilize the shoreline; their stems and roots trap fine sand and soil particles, forming an erosion-resistant layer. By inhibiting wave damage they provide the coast with buffer against the sea's forces and control runoff, thereby reducing siltation in estuaries and sea grass beds. Mangroves are a major source of food and nutrients to estuarine, lagoons and near shore coastal waters and provide a nursery for the early stages of commercially important crustaceans and fish. Mangroves are widely harvested for subsistence but also for commercial purposes.

Coral and sandstone reefs are common along the coast of Sri Lanka. Coral reefs dissipate wave energy and thus enhance coastal stability by containing erosion. Sandstone reef habitats dissipate wave energy and thus enhance coastal stability by containing erosion and provide habitats for variety of flora and fauna. The most extensive coral reefs in Sri Lanka are the patchy coral reefs in the northwestern coastal and offshore waters, occurring within the Gulf of Mannar, west of the Kalpitya peninsula and on the western and eastern coastal areas.

Seagrass**:** beds comprise a highly productive habitat that supports many commercially important organisms. They serve as breeding and feeding grounds of marine organisms, and are the main habitat of the endangered dugong. Prominent seagrass beds are found in Gulf of Mannar, Palk Bay and Palk Strait and in several basin estuaries and lagoons. Seagrass beds bind sediment and stabilize the coast against erosion.

Quantifying changes on climatic variables in Sri Lanka

The forecasts for global sea level rise in this century vary considerably, but the Inter-governmental Panel on Climate Change (IPCC) has provided a central estimate of 0.2 m and 0.5 m rise by the years 2050 and 2100 respectively. By 2100 a general shoreline retreat of 25 m is expected, corresponding to an average retreat of 0.25 m per year. However, coastal erosion is controlled by winds, waves, surges, geomorphology and geology. In critical areas coastal erosion rate may vary from 1-13 m/year.

The surface temperature record, as compiled by Jones *et al.*, 1997 offers the most convincing evidence of sea surface warming. The global temperature record from 1870 falls into four periods. The first (1870-1910), when urban development and heating standards were modest, shows no definite trend. The second, from 1910 to 1945 showed a temperature increase of about 0.5°C. The third, from 1946 to 1975, showed a fall of about 0.15°C. This period coincides with the expansion of the aviation industry, with removal of many weather stations to airports, and an expansion of the system to rural areas. The period after 1976 – characterized by rapid expansion of human population, motor traffic and economic wealth – shows a rise of about 0.5°C.

Meteorology

In general, cyclones are generated in the Bay of Bengal during October and November. The mean annual occurrence of cyclones is 0.2, indicating a return frequency of cyclones every five years. Globally, climate change has shown increasing frequency and intensity during the last three decades; however, the trend in Sri Lanka is opposite.

It is believed that human-induced climate change, rather than naturally occurring ocean cycles, may be responsible for the recent global increases in frequency and strength of hurricanes. During the period from 1901 to 1995, 13 cyclones hit the Sri Lankan coasts.

Climate-induced environmental changes

Earth is a warm, wet planet. History provides clear evidence that a warm wet world is optimal for organisms. Ability to cope with the changing climate, habitat and resource is essential for the survival of species. Mobile and adaptable species are the most likely survivors.

Sea level rise induced by climate change and inflow of surface runoff and river inflow may change the physio-chemical characteristics of coastal waters, generating an adverse impact on the coastal fishery and aquaculture. It can cause inundation of low-lying areas, shoreline retreat, saltwater intrusion into coastal water bodies and rivers and sandbar formation at the mouths of water bodies and rivers. The major issues/ problems can be listed as following;

- Enhanced erosion;
- Salination/ salt water intrusion into low lying coastal plains;
- Ecosystem changes (*e.g.* conversion of brackish water into hypersaline water);
- Closing of river mouth – reduced water exchange, accumulation of pollution;
- Tourism – loss of beaches;
- Destruction of sensitive habitats; and
- Destruction/ damage to archeological/ historical, religious and cultural sites.

Biological environment

Seawater rise associated with climatic change means less food, offspring and oxygen for fish populations in addition to changes in rainfall patterns, currents and sea levels. Hotter temperatures are expected to stunt the growth of some fish, resulting in fewer offspring. Normally, fish metabolism speeds up as temperature rises, and insufficient food supplies could slow their growth and reproduction rates. Sudden fish kills have been observed in some enclosed water bodies such as Berai Lake in Colombo during unusually hot days.

Coastal erosion, associated with sea level rise, exerts a profound impact on the beach seine fishery, which contributes about 5 percent of the total fish production, and requires fairly large tracts of beach area for net-hauling and drying.

Sensitive habitats are fragile, thus vulnerable to climatic changes. Most of the sensitive habitats in Sri Lanka are in different degrees of degradation owing to climatic changes and anthropogenic effects, resulting in decline of resources.

Impact of climate changes on coastal communities

The biological and socio-economic implications of salination and saltwater intrusion on marine and coastal ecosystems caused by sea level rise are extensive. These include reduced biological diversity and productivity, declining land values and reduced revenues from tourism, fisheries and other development activities. Saltwater intrusion into groundwater means less freshwater, including water for drinking, in coastal areas.

Sand mining on the coast increases coastal erosion. River sand mining leads to erosion of river banks and deepening of river beds. The latter leads to intrusion of salt water into rivers, endangering water supply schemes.

Coastal erosion results in loss of beach and landscape quality, damage to private houses, public buildings, hotels and infrastructure. Sea level rises could lead to difficulties for shore-based communities: for example, many major cities such as Galle, Matara and Hambantota already need storm-surge defenses, and would need more if sea level rise accelerates.

Presently, coastal erosion is managed by installing coast protection structures, using setback lines, avoiding development on erosion-prone coasts, and enforcing regulatory mechanisms. The recommendations in this regard are:

- Stop sand mining on beaches and rivers;
- Stop coral mining;
- Promote vegetation and mangrove culture; and
- Promote offshore sand mining.

Fisheries and fishing communities

The impact of temperature rise on fish populations is not adequately known because of lack of long- term research monitoring on the subject. But with coastal fishery resources under pressure because of overfishing, climate changes will likely aggravate the situation to the stage of no recovery.

Larger-scale sea fisheries production is not under immediate threat due to climatic changes. The fisheries most sensitive to climate change are among those most affected by human interventions – such as those in dams, wetlands, coastal areas, manipulated habitats and areas affected by population growth.

Coastal agriculture and farming community

Traditionally, agriculture has been the mainstay of the Sri Lankan economy. It has also provided about 35 percent of the employment and 21 percent of the national output. Almost 72 percent of the population engages directly or indirectly in agricultural activities.

Climate changes predicted as a result of increases in greenhouse gases are likely to impact farming systems. The changes are sea level rise, higher tropical surface temperatures, increased tropical cyclone frequency and severity, and changes in cloud cover and precipitation.

Rising sea levels inundate coastal farmlands, enhance salt-water intrusion, make coastlines retreat and force shifts to more salt-tolerant activities like shrimp farming. Changes in precipitation reduce returns on existing water resources, reduce plant propagation and aggravate plant disease patterns.

The possible impacts of climate change on farming systems include:

Changes in weather pattern: The IPCC has stated that the global average surface temperature has increased since 1861. In Sri Lanka the data analyzed for more than 100 years from 14 meteorological stations across Sri Lanka recorded a temperature increase of $0.01^{\circ}C$ - $0.036^{\circ}C\ y^{-1}$ during the last 30 years.

During the same period, rainfall had decreased by 10 to 35 mm across Sri Lanka, except on the northwest coast, where the rainfall had increased by 9 to 17 mm. Precipitation, evaporation and transpiration patterns are not stable or predictable. Flood control, drainage, and irrigation infrastructure have to evolve with change. As sea level rises, low-lying coastal plains, particularly Jaffna Peninsula, are prone to inundation, saline groundwater intrusion and drainage congestion.

Sri Lanka was devastated by the December 2004 tsunami along 1 200 km (68%) of its 1 770 km costal belt. At some places, marauding seawaters intruded 2-3 kilometers inland, damaging most seawater-sensitive crops – not only farm fields, but also thousands of small home gardens where the rural folk grow vegetables and fruit trees. Irrigation and drainage canals within 200 m of the coastline were severely damaged.

Proposed actions and recommendations

Coastal planning should take into account the impacts of climate change – especially sea level rise, higher temperatures, prolonged droughts, severe rainfall, cyclones and storm surges. Integrated coastal zone management is essential for coastal zone planning, management, monitoring and evaluation. It requires close coordination with government agencies and communities. Needed action:

Mariculture/ aquaculture

- Expand aquaculture to increase and stabilize seafood supplies, help stabilize employment, and carefully augment wild stocks (Batticaloa, Kalpitya, Chilaw). Introduce aquaculture, mariculture and fish farming. Potential areas for mariculture are Gulf of Mannar, Koddiyar Bay in Trincomalee, Jaffna and Hambantota.
- Promote culture of seaweed, clams, spiny lobsters, sea cucumber, oysters, bivalves, Cobia (*Rachycentron canadum*), Pompano (*Trachinotus blochii*), Giant trevally (*Caranx ignobilis*), Rabbit fish (*Siganus janus*) – Kalpitya, Rekawa, Batticaloa, Trincomalee.
- Encourage Graciliaria (seagrass) and Eucheumia farming in the open sea and in abandoned shrimp ponds – Dutch Bay, Muttur, Kinnya.
- Promote oyster farming and crab fattening activities – Rumassala, Trincomalee Bay,
- Introduce artificial production of marine ornamental fish in selected coastal districts — Negombo, Beruwala, Chilaw, Bentota, Weligama.

Infrastructure

- Develop resources and facilities for culture fisheries development activities, verification studies, testing feeds. Set up a computerized information system linking major markets, exporters and producers.

Technology transfer

- Transfer technologies for culture of fisheries and seaweeds to communities.
- Introduce fish aggregating devices.
- Set up pilot projects for the culture of Asian seabass, grouper in cages, mud crabs and molten crabs in concrete tanks, mollusks culture in cages and oyster farming.

Socio-economics

- Develop production strategies for culture fisheries.
- Improve market access for marine products including suitable methods of processing and value addition.

- Strengthen the trader-export value chain.
- Promote family/ small-scale farmer approach.
- Strengthen fishery cooperative societies, and increase the participation of women in their activities.
- Increase fish production through the development of small-scale community based production units.
- Promote entrepreneurship development and provide access to technology, technical expertise, information systems, credit and extension services.

Public awareness

- Improve public awareness about fish handling to reduce fish spoilage and improve the quality of fish. This will make possible higher prices for fishers and better living standards.
- Promote awareness on sophisticated methods of fish processing including dry processing and vacuum- packing, through training and better processing facilities.
- Promote habitat conservation.

Management

- Strengthen community participation in the management of coastal habitats.
- Strengthen research on management systems and aquatic systems, leading to innovation.
- In coastal areas, integrate the management of fisheries with other uses of coastal zones.
- Monitor health problems (*e.g.* algal blooms, cholera) that could be aggravated by climate change and harm fish stocks and consumers.

Research Requirements

- Evaluate the potential impact of sea level rise and beach erosion on infrastructures, harbours, anchorages and beach landings.
- Identify erosion trends and formulate appropriate mitigation measures.
- Identify untapped potential for mariculture and aquaculture.
- Carry out biological studies on culture species.
- Identify constraints to increasing volumes and prices of seaweed.

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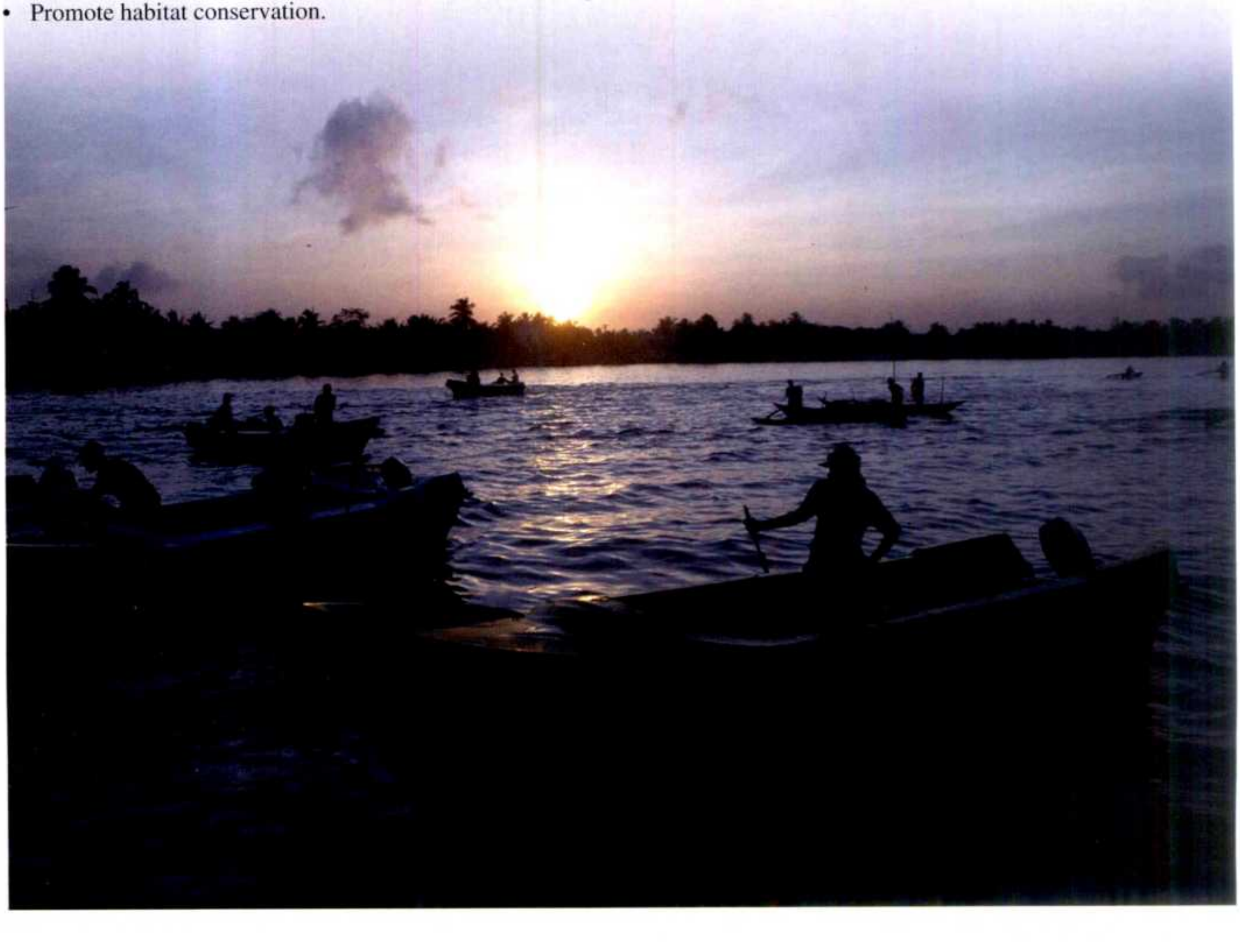

Fishing Harbours and Fish Markets of Japan - A treat to the eyes

Photo Essay by Y S Yadava

A visit to fishing harbours and fish markets in Japan is an exciting experience. Cleanliness and orderliness is amazing and awesome. Facilities are simple but highly mechanized and modern. No compromises are made in the hygienic handling of fish and fish products until they reach the consumers. They set international benchmarks in sanitation and hygiene.

This photo feature, second in the series of articles on Japanese post-harvest infrastructure, provides glimpses into the fishing harbours and fish markets in Hokkaido province of Japan. The first article featured the Metropolitan Central Wholesale Market of Tokyo at Tsukiji (*Bay of Bengal News, Vol IV, No 9, September 2006, pp 21-24*).

The journey to various places of fisheries importance in Hokkaido province was undertaken in September 2007 as a part of the Training Project for Promotion of Community-based Fishery Resource Management by Coastal small-scale Fishers. The International Cooperative Fisheries Organization of the International Cooperative Alliance is implementing the project. BOBP-IGO is one of the partners.

The province of Hokkaido, an important fishing area of Japan, is surrounded by three waters; the Pacific Ocean, the Sea of Japan, and the Okhotsk Sea. It has a 3 045 km coastline which makes up 9 percent of Japan's coastline. There are very productive fishing grounds east of Hokkaido, where a branch of the current from the northward-flowing Kuroshio warm current and the southward-flowing Oyashio cold currents meet. There are also wide continental shelves and seamounts.

Hokkaido houses 14 per cent of Japan's fishers and accounts for a full quarter of the country's

Fishing port of Notsuke FCA, which is important for the landings of chum salmon Oncorhynchus keta *or Shirozake in Japanese (1-4).*

HACCP is widely integrated into all the processes – from harvesting to post-harvesting activities (5).

Hakodate is one of Japan's major fishing ports. A wide variety of fishes are traded in the auction hall of the fishing port (6-7).

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total fish catch. The fisheries sector in Hokkaido is a major economic sector of the prefecture, constituting about 15 per cent of the total primary industries production of Hokkaido. In 2005, the total fisheries production including aquaculture from Hokkaido was 1.4 million tonnes, which constituted 24.8 percent of Japan's total national production (5.67 million tonnes). The main fisheries are scallop, salmon, Alaskan Pollack, Atka mackerel and kelp. Hokkaido accounts for almost the entire national production of these species.

The coastline of Hokkaido province is dotted with fishing harbours and fish landing centres. These infrastructure facilities are mostly managed by the Fisheries Cooperative Associations (FCAs) and are highly organized. They offer excellent landing and berthing jetties, auction halls, ice for preservation of fish and other forward and backward linkages for harvest and post-harvest activities.

The FCAs carry out several professional, business and community functions. They take active part in welfare programmes for fishers, such as financial service and health management. They also help out with communications and disaster and crime prevention. FCAs often serve as core centers for the regions.

Japanese are connoisseurs of fish and fish markets play an important role in meeting this dietary requirement. Fish markets abound with varieties of fin and shell fish species and products procured from different parts of Japan and from abroad. They run a riot of colours, tempting the customers. I visited two markets in Hokkaido province – the fish market in Hakodate city and the '*Nijo Ichiba*' (South 2nd Street Market) market in Sapporo city.

The *Nijo Ichiba* is more than 100 years old and was once also ravaged by fire. Today, the retail shops in *Nijo Ichiba* have established a cooperative and the fish market for general consumers and tourists. Many tourists come to visit the market since they can buy almost all kinds of fish and fishery products produced in Hokkaido. *Nijo Ichiba* attracts people not only from within the country but also from neighbouring countries such as Taiwan, Korea, Russia and China, etc.

Women in fishing communities play multiple roles. They often take part in fishing, sort the fish by species and size after landing and prepare the fish for shipping by loading ice in the fish box (1-3).

Fishery products account for 40 percent of the animal protein intake (20 percent of the total protein intake) of Japanese people (4-6).

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たらこ
甘海老わさび
味噌塩辛
帆立耳三升漬
手造り塩辛
いくら
3パック

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National Workshop on
Safety at Sea for Small-scale Fisheries
Negombo, Sri Lanka, 11-12 October 2007

Sri Lanka Workshop Makes Recommendations on Safety at Sea

Several ideas and recommendations emerged from a National Workshop on Safety at Sea for Small-scale Fisheries, held in Negombo, Sri Lanka on 11-12 October 2007. It was organised jointly by the FAO (Food and Agriculture Organization of the United Nations) and the BOBP-IGO, and drew an audience of 44 – from government agencies, fisheries co-operative societies and boatyards. Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources (MFAR), Government of Sri Lanka chaired the workshop.

After an inaugural session and a technical session, three groups of workshop participants huddled in conclave to discuss three subject areas: (i) Knowledge gaps on safety awareness in fisher communities; (ii) Knowledge gaps on safety at sea initiatives in national agencies; and (iii) Knowledge gaps on safety aspects in fisheries. They adopted three "action points" for implementing a Safety at Sea Project in Sri Lanka:

- All pilot-scale activities will be carried out at Beruwala, a major fishing centre south of Colombo.
- A committee comprising nominees from national fishery agencies, district fishery bodies, fisheries co-operative societies, local leaders of influence, and women from the fisher community, will be formed to oversee the pilot activities.
- A baseline survey will be conducted to assess present knowledge and awareness of safety at sea aspects. The MFAR and the Department of Fisheries and Aquatic Resources (DFAR) will conduct the survey on the basis of a questionnaire prepared by BOBP-IGO for each category of stakeholders. This will serve as a benchmark for monitoring the effectiveness of the awareness campaign.

Mr G Piyasena, Secretary, MFAR speaking at the inaugural session
Safety at Sea for Small-scale Fisheries
Negombo, Sri Lanka, 11-12 October 2007

Inaugural Session

At the inaugural session held earlier, FAO Representative Pote Chumsiri welcomed workshop participants. He said the FAO's close links with the Ministry of Fisheries and Aquatic Resources had been strengthened after the 26 December 2004 tsunami. Both agencies had worked together as a team to restore the livelihoods of fishers and strengthen the industry to 'build back better'.

Mr Piyasena said safety at sea is often neglected in developing countries, particularly in small-scale fisheries, because of inadequate awareness of safety issues, lack of safety guidelines for fishing crafts and methods, poor distress response strategies and infrastructure, and inadequate rules and regulations to address the needs of small-scale fishermen. The FAO's global safety at sea project would address these issues.

Mr R Ravikumar, FAO Regional Coordinator for the South Asia component of the Project on Safety at Sea for Small-scale Fisheries in Developing Countries, said this component would be implemented in cooperation with the BOBP-IGO. Besides, an IMO-FAO Project would focus on Guidelines for the Design, Construction and Equipment of Small Fishing Vessels. Both projects would be funded by the Swedish International Development Agency - Sida.

Mr Ravikumar said the Project would focus on (i) awareness-building to promote a safety at sea culture within the fishing community and other stakeholders; (ii) education and training of trainers, extension workers and fisherfolk to understand sea safety requirements; (iii) introduction of FAO/ IMO/ ILO draft guidelines for design and construction and equipment of small FRP fishing boats; (iv) supporting the elaboration of proposals for implementing safety regulations as part of fishery management measures; (v) review of accidents-at-sea reporting systems and design of an appropriate reporting and analysis procedure for implementation by appropriate authorities; (vi) promoting gender and HIV/AIDS awareness-raising campaigns in connection with safety-at-sea awareness campaigns; and (vii) promoting adequate representation of women and youth in safety-at-sea work ethics.

Mr Neomal Perera, Deputy Minister of Fisheries and Aquatic Resources, said (in a paper read out by Mr L S Fernando, Chairman, National Institute of Fisheries and Nautical Engineering), that statistics proved that fishing is one of the most dangerous occupations in the world. But existing regulations covered only large vessels and exempted vessels under 24 meters. In most countries, safety education and training are carried out on a voluntary basis, and are not obligatory. It is now argued, he said, that safety at sea should be integrated into the general management of fisheries. He hoped that the new FAO project would move forward initiatives already taken to improve sea safety for small-scale fishermen in Sri Lanka.

In his inaugural address, Mr Felix Perera, Minister of Fisheries and Aquatic Resources (in a paper read out by Mr D R Jayasinghe, Chairman, Cey-Nor Foundation) thanked the FAO for its contributions to fisheries development in Sri Lanka. He recalled that FAO played the leading role in securing over US $23 million for tsunami rehabilitation in fisheries in Sri Lanka. All FAO tsunami-rehabilitation projects had been implemented in close collaboration with his Ministry and its agencies. He thanked the FAO, also the Government and the people of Sweden for helping improve the sea safety of small-scale fishers in developing countries.

Dr Y S Yadava, Director, BOBP-IGO proposed a vote of thanks.

Technical Session

Four presentations were made in the technical session. Mr H S G Fernando, Director-General (Development), MFAR, discussed the 'Current status of safety-at-sea initiatives in fisheries'. He said fishing boats in Sri Lanka had increased in number by 35 percent after the tsunami. The highest increase was in motorized traditional craft (175 %), followed by multiday boats (66 %) and FRP outboard boats (54 %). But the number of day boats had fallen by 23 percent.

Providing an overview of fishing-related accidents at sea, Mr Fernando said that the number of accidents had fallen from an average of 32 per year during the period 1994 - 2001, to 10-20 per year during the period 2002 -2006. He said the major causes of accidents at sea were drifting, collision and capsizing and sinking. Inferior quality of engines and bad installation, poor operation and maintenance, lack of practical knowledge on trouble -shooting, non-availability or non-operation of navigational lights, loss of stability, crew fatigue and operation in the rough sea were some of the major reasons for the accidents in Sri Lanka.

He said effective approaches to safety at sea should rely on three lines of defense – prevention (the most reliable and cost-effective method); survival and self-rescue; and Search and Rescue (SAR), the most costly approach.

He said legislation is necessary on vessel standards and specifications, vessel design and construction, safety training, etc. Community training programmes for promoting safety at sea, community participation and insurance schemes for fisher communities were essential.

Emphasizing the need to make safety at sea an integral part of fisheries management, Mr Fernando said the Government of Sri Lanka had taken initiatives to draft the Fishing Boat (design, construction and equipment) Regulations and the Fisheries and Aquatic Resources (Amendment) Bill. The recently established 'Vessel Survey Unit' of DFAR should be strengthened. Safety training courses for skippers of multi-day boats and awareness programmes to inculcate a safety culture among fishing communities were two other suggestions he made.

Commander Kalana Jinadasa of the Sri Lanka Navy presented an 'Overview of Search and Rescue Operations and recommendations'. He said the 1979 SAR Convention was designed to provide a global system for responding to emergencies, while the GMDSS was established to provide it with efficient communication support. Both the GMDSS and SAR are crucial to maritime safety and are designed to ensure that any emergency at sea will result in a distress call.

The Convention outlines operating procedures to be followed in the event of emergencies or alerts and during SAR operations. The Convention has divided the world's oceans into 13 areas for search and rescue purposes. Parties to the Convention are required to ensure that arrangements are made for adequate SAR services in their coastal waters. The Government of Sri Lanka is yet to ratify the Convention.

Commander Jinadasa said that SAR is a costly operation. Search by air is the most effective method, but it can be prohibitively costly. One of the cost-effective ways to implement SAR is to form local safety-at-sea organisations. They can be set up nationally and help to conduct awareness campaigns, safety courses, fund-raising and lobbying. They can also provide volunteers to take part in SAR when the need arises.

A presentation on 'Overview of Standards and Procedures followed in Design Construction and Equipping of Fishing Vessels in Sri Lanka' was made by Mr G J D W Dayananda, Marine Engineer, DFAR. He said that fishing vessels in Sri Lanka are built in more than a hundred boatyards scattered in the coastal areas of the country. Every boatyard ought to be registered with the DFAR after fulfilling stipulated conditions relating to infrastructure facilities, compliance with industrial safety regulations, environmental clearance, etc. It should exercise quality control procedures – such as regularizing temperature and humidity, maintaining workshop machinery and tools to suit construction.

Mr Dayananda said that DFAR is enforcing standards but in a legislative void. The void was exploited by boatbuilders after the tsunami. They set up a number of boatyards and constructed inferior boats. Since regulations had now been drafted with FAO help, enforcement would be much easier. The DFAR needed capacity-building and further strengthening to meet the changing requirements of the boatbuilding sector.

Mr Shanta Bhandara, Director, MFAR, made a presentation on 'Strategy for building awareness within the fisher community for developing a sea safety culture'. He said that Sri Lanka has 2 637 marine fishing villages and some 200 000 fishers (including inland fishers). If trade/ service/ input suppliers and those who depend on their livelihoods for fishing are added, the total number would go up to about 2 400 000. Thirty six national and international NGOs are active in fisheries in the country.

He stressed the importance of fisheries co-operative societies – which function as a community organization: to carry out fisheries development schemes, promote thrift in the fishing community, implement credit schemes, mediate conflicts among fisherfolk, help implement management plans and serve as community mobilizers.

Mr Bhandara urged formal training for field officers (training of trainers), and for fishermen as well, on safety at sea. The training needs should focus on IMO guidelines, on the FAO manual relating to safety of fishermen, and on DFAR regulations relating to safety of fishing vessels. The awareness programmes should be conducted at fisheries harbours, anchorages and fish landing sites and also at the general meetings of fisheries societies. Extension methods would include short documentary films, posters, notices, radio programmes, cartoons and leaflets. Stickers could be put up on fishing boats.

Mr Piyasena hailed the success of the workshop and thanked the BOBP-IGO for organizing it.

Ideas Abound at Sea Safety Workshop in Chennai

Forty three persons took part in the National Workshop on Safety at Sea for Small-scale Fisheries, held in Chennai on 3 - 4 December 2007. They represented the Ministry of Agriculture; the Coast Guard; the coastal States of Andhra Pradesh, Orissa and Tamil Nadu and the Union Territory of Puducherry; fisheries education institutions; fisheries associations; fishing boat manufacturers; NGOs; the National Institute of Occupational Safety and Health (NIOSH) of the United States; the Food and Agriculture Organization of the United Nations (FAO) and the BOBP-IGO.

Mr Ajay Bhattacharya, Joint Secretary, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, chaired the workshop.

Welcoming participants, Dr Y S Yadava, Director of BOBP-IGO, said the workshop took forward two earlier initiatives – the Chennai Declaration on Safety at Sea for Small-Scale Fishers (October 2001) and the Third International Fishing Industry Safety and Health Conference (February 2006).

Mr Per Danielsson, Fishery Industry Officer (Safety at Sea), Fishing Technology Service, FAO Rome, briefly explained the objectives of the South Asian component of the Global Project on 'Safety at Sea for Small-Scale Fisheries'. He said the project aims at improving the livelihoods of small-scale fishing communities by reducing the number of accidents at sea. It will implement a whole gamut of safety-related activities, such as awareness-building to promote a safety-at-sea culture in fishing communities; education and training to understand sea safety requirements; guidelines for design and construction of small FRP fishing vessels; appropriate reporting systems for accidents at sea; and adequate representation for women and youth in promoting safety-at-sea work ethics.

Mr Bhattacharya said the Government of India is implementing an insurance scheme that provides some relief to a fisher family in the event of death or permanent disability to the earning member. Tamil Nadu utilizes a substantial part of the assistance provided under the scheme, he said. He suggested that accidents statistics should be analyzed so that it could be ascertained why more accidents are reported from Tamil Nadu than from any other coastal state.

Mr Bhattacharya said that sea safety continued to pose problems despite a few measures – construction of 30 patrol boats during the mid-1990s, and the setting up of a Coastal Security Wing in Tamil Nadu under the control of an Additional Director General of Police, and an active Indian Coast Guard. He promised full government support to the project, and said the government would carry its lessons to other states.

Mr R Ravikumar, FAO Regional Project Coordinator- South Asia for the Safety at Sea Project, made a presentation on 'A Holistic Approach to a Safety-at-Sea Programme'. He said that neglect of safety at sea resulted from inadequate awareness of its importance; lack of safety guidelines for fishing craft and methods; poor distress response strategies and infrastructure; and inadequate rules and regulations in small-scale fisheries.

He said the regional project would be complemented by an IMO-FAO project relating to Recommended Guidelines for the Design, Construction and Equipment of Small Fishing Vessels.

Mr Ravikumar said that training and awareness campaigns for fishers must address a number of issues such as (i) understanding the service limitations of fishing vessels and occupational hazards; (ii) use of life-saving appliances and communication devices; (iii) survival at sea; (iv) hull and engine maintenance; (v) pre-voyage and post-voyage checks; (vi) awareness of national and international rules & regulations; (vii) weather warning mechanisms; (viii) distress response

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Chennai, India, 3-4 December 2007

Mr Per Danielsson, Fishery Industry Officer, FAO speaking at the inaugural session protocol; (ix) reporting of accidents; (x) life and vessel insurance; and (xi) community role in developing a sea safety culture and community health programmes.

He also said that skippers of boats that are equipped with GPS and VHF must be well-versed in using such equipment. All fishers need to be trained in rescue at sea. Boatbuilders must be made to understand the need for technical guidelines for fishing vessel construction and must be trained to adopt good boatbuilding practices.

Mr Ravikumar said that the Merchant Shipping Act, which came into being in 1958 largely focusses on fishing vessels above 24 meters. Smaller fishing vessels are presently not being attended to. Consequently, they do not conform to any particular standard.

It is imperative that a set of technical guidelines for fishing vessel design, construction and equipment should be made available, Mr Ravikumar said. He also said that safety at sea must be integrated into the general management of fisheries in all coastal states.

Discussing the project's approach, he said the first step would be to assess knowledge gaps among all stakeholders – the fisher community, government agencies and the service sector – besides assessing mechanisms already in place that may need improvements. The next step is to design an awareness campaign and develop technical guidelines for fishing vessels and fishing operations.

Mr Arvind Kumar, Commissioner of Fisheries, Andhra Pradesh, made a presentation on 'Safety at Sea Aspects of Small-Scale Fishermen of Andhra Pradesh'. He said that according to a 2005 census conducted by the Central Marine Fisheries Research Institute (CMFRI), the State's marine fisher population is approximately 0.51 million, including an active population of 0.138 million fishers spread over 498 coastal villages. The marine fishing fleet comprises 2 541 mechanized, 14 112 motorized and 24 386 traditional boats. Increase in effort, particularly by the mechanized fishing fleet, had reduced catches in recent years.

Mr Kumar referred to the FAO-TCP project on Sea Safety Development implemented during 1997-1999, following the November 1996 killer cyclone of Andhra Pradesh. Under this project, radio transmission towers were set up at two locations; 100 VHF sets, 100 FRP life floats, and engines were supplied for search-and-rescue (SAR) operations; fisheries staff were given training; the capacity of the Department of Fisheries (DoF) was strengthened; Storm Safety Action Groups (SSAGs) were set up in the 30 most vulnerable villages, and equipped with a transistor radio, bicycle, first aid kit, mega phone, rain coats, gum boots, torch lights, etc. Contingency plans were prepared for these villages.

Mr Kumar said that after the success of the pilot project, the government extended its activities to other districts of the State. As a result, 12 shore stations were established, more SSAGs were formed, and training was provided at the State Institute of Fisheries Technology, Kakinada. The reduction of fishing-related deaths at sea in succeeding years reflected the project's success.

Mr Kumar said that mechanisms like registration, certification and inspection, carried out for larger fishing vessels, do not exist for small country crafts. Communication and navigation equipment on small-scale fishing vessels are inadequate. Construction standards are poor too.

Mr Kumar stressed the need for accurate weather bulletins that reached fishers on time; development of safe landing and berthing places along the State's coastline; a registry of fishing boats and crew. SAR effort is often jeopardized by delays in receipt of information about missing fishers, he said. In the absence of vital information, it's difficult for the Coast Guard to focus its SAR operations.

He said that to integrate safety at sea with the larger issue of fisheries management, a holistic approach would be required, encompassing the socio-economic uplift of poor small-scale fishers.

Mr Shambhu Kallolikar, Commissioner of Fisheries, Tamil Nadu spoke on 'Safety at Sea Aspects of Small-scale Fisheries of Tamil Nadu'. He said Tamil Nadu has 13 coastal districts. Its 1 076 km coastline is unique because of three distinct zones: the Coromandel Coast, the Palk Bay and the Gulf of Mannar. The total marine fishermen population of Tamil Nadu is 0.81 million. Against an estimated marine fisheries potential of 0.72 million tonnes, the fish production in the State is 0.392 million tonnes. The fishing boats are varied; they include wooden and FRP catamarans and vallams, and mechanized fishing boats.

Mr Kallolikar said that mechanized boats in Tamil Nadu had been registered and licensed for fishing nearly a decade ago. To assess the exact strength of the fleet after the 26 December 2004 tsunami, a new re-registration process was taken up by the DoF. Following this exercise, the total number of fishing crafts of various categories registered in Tamil Nadu was estimated at 44 688, Mr Kallolikar said. Identity cards have also been issued to 2 18 566 fishers.

On accidents at sea involving fishers from Tamil Nadu, he said that during the period 2001-2006, 64 fishers died and 55 were reported missing. To improve safety at sea, a subsidy of 25 percent (up to a maximum of Rs 30 000 per vessel) was provided by the government for fixing VHF and GPS units in mechanized fishing vessels below 25 meters in length. The state government had provided 50 VHF sets and 10 GPS on a trial basis to mechanized fishing vessels. A proposal for providing seamless communication to all fishing crafts is being considered. Rules have been formulated for the safety of deep sea vessels.

Mr Kallolikar detailed the training being imparted by the DoF on various aspects of safety at sea, navigation, operation and maintenance of engine, etc. He also mentioned the supply of life-saving appliances (life jackets, waterproof lanterns first-aid boxes, etc) to fishers under various programmes; the role of the DoF and other State agencies in disaster mitigation; and response and insurance coverage for fishers and fishing vessels.

Mr Hasan Manikfan, Director, Central Institute of Fisheries Nautical and Engineering Training (CIFNET), briefed the audience about the 'Role of CIFNET in Training of Seafaring Fishers'. Mr Manikfan said that CIFNET had a well-equipped nautical division, marine engineering division, and a craft and gear division, to train fishers.

He said that CIFNET conducts regular courses for those who man fishing vessels. These include a Mate Fishing Vessel Course and an Engine Driver Fishing Vessel Course, both upgraded now to 24 months from 18 months; and a four-year degree course in Bachelor of Fisheries Science (Nautical Science). The institute also conducts ancillary courses, statutory courses, refresher courses and short-term courses in different fisheries disciplines, plus a number of short-term programmes.

Mr Manikfan said that basic safety training should be provided to all fishing vessel personnel before being assigned to any fishing vessel. The training should be based on an analysis of the prevailing needs and conditions in each particular area. He proposed a simplified course for training small- boat fishers at the village level.

Mr Oyvind Gulbrandsen, FAO Consultant spoke about 'Status of Fishing Boats on the East Coast of India'. He said that communication is the key to sea safety. Nowadays even small-scale fishers carry mobile phones, GPS, etc. Bigger fishing vessels carry echo sounders & VHFs. "We know the limitation of mobiles, but it is better than nothing. Very few fishers had these 10 years ago", he said.

Mr Gulbrandsen pointed out that navigation lights were either missing or defective in 80 percent of fishing vessels. "Very few fishers use life jackets or life floats. The smaller crafts are our biggest challenge. The wooden catamaran may look primitive, but it cannot sink regardless of the danger. But the new FRP catamarans are defective and vulnerable to danger." He said that 25 years ago BOBP had introduced FRP boats (the IND-20) on the east coast. Today, they are scattered everywhere in Tamil Nadu. "Thousands of boats are being built by inexperienced people. FRP has come here to stay. But FRP is not a good material to take abrasions and many boats can be seen with cracks that need patches."

Mr Gulbrandsen was critical of the 'long-tail' system of propulsion in boats. "These are not suitable for the surf-beaten coast. Lots of deaths and injuries are taking place; some protection around the propeller is essential. The BOBP-liftable propulsion system – the bellow drive – is a much safer option," he said.

In a brief presentation, Dr George Conway, Director, Alaska Center of NIOSH, USA, recalled that mortality among fishers in Alaska was high because safety measures were lacking. But once the causes were examined and interventions made, the fatalities and accidents reduced significantly. Alaskan fisheries today are a good example of safety at sea. "It is worthwhile to examine whether the Alaskan experience can be exported to other parts of the world."

In a question-answer session that followed the technical presentations, Commandant B P Singh, Chief Staff Officer, Indian Coast Guard (Visakhapatnam Base), said that on the Andhra coast, 11 SAR operations were carried out during the previous 12 months (each operation lasting 72 hours) at a cost of approximately Rs 0.5 - 1.0 million. Twenty three fishermen had been rescued. He urged that boats should have a uniform system (design, colour, etc) for display of boat registration numbers. FM Radio can be a useful tool in the hands of fishers. "Since fishers are not the actual boat owners, their safety is compromised. The Coast Guard comes in late, often very late".

Participants raised the issue of insurance coverage for fishers, suggesting that it should be raised to a million rupees. Fishing vessels should be provided with life time insurance coverage.

After the technical sessions, participants formed three groups to discuss three topics: (i) knowledge gaps in fisher communities on safety awareness; (ii) knowledge gaps in national agencies on safety at sea initiatives; and (iii) knowledge gaps in the service industry on safety aspects for fisheries sector.

Mr Jagan Seshadri, Additional Director General of Police, Coastal Security Group, Tamil Nadu, chaired the discussions on group presentations.

Participants said cell phone companies should be persuaded to increase the seaward range of mobiles.

Mr Vijay Boda, President, RESTORE, urged a comprehensive and sustained examination of the health of fishers. It was suggested that health camps should be organized for fisher communities, and that a first aid clinic should be set up in each fishing harbor. Participants also emphasized the need to establish a formal mechanism to report accidents at sea, and to formulate an action plan to integrate safety at sea with fisheries management.

(Continued on page 42)

Marine Fisheries Academy, Chittagong

Oceans are repositories of wealth. They provide fish for food besides minerals, chemicals, oil, gas and energy resources.

To tap the resources of the Bay of Bengal, the Government of Bangladesh decided in December 1971, soon after its independence, to establish a professional training institute that would turn out skilled manpower.

Consequently, the Marine Fisheries Academy (MFA) came into being in Chittagong on 01 September 1973, with assistance from the former Soviet Union, as a project of the Bangladesh Fishery Development Corporation (BFDC). The only professional and national-scale training institution for fishery officers, the MFA provides skilled navigators, engineers and processing technologists for fishing fleets and fish processing industries.

The Academy's 10-acre campus sits on a beautiful landscape on the southern bank of the river Karnaphully, opposite to Sadarghat, Chittagong. It is about 10 km away from the Chittagong city center and about 350 km from Dhaka, the capital.

Since inception, the Academy has been training seafearers and fishers. It came under the direct administrative control of the Ministry of Fisheries and Livestock from 01 July 1993.

The MFA's facilities

The Academy has 17 officers and 46 staff and is headed by the Principal. It is equipped with an administrative-cum-training block, an academic block, marine workshops, a parade ground, and laboratories for physics, biochemistry, biology and information technology. It also has accommodation for cadets and officers, an inspection bungalow, plus a unique fish museum with some 375 types of fish species. This infrastructure is being expanded.

Mandate and vision of MFA

- To produce skilled manpower in the areas of navigation, engineering, food processing and preservation and thereby increase the harvest of fish, shrimp and other commercially viable sea animals; overcome the protein deficiency of the population; and earn foreign exchange through export of sea food.
- To organise human resources in the areas of navigation, gear technology, marine engineering, fish processing & quality control, so that they meet the growing demands of marine fishing in Bangladesh and elsewhere.
- To explore and harvest the country's marine resources and overcome protein deficiency.
- To assist friendly countries by helping train their cadets.
- To provide IT knowledge to the trainees.
- To increase the job opportunities of the cadets at home and abroad by enhancing their IT learning.
- To contribute to the national economy through trained human resources.
- To alleviate poverty, diversify exports, influence the policy environment.

Course & curriculum of MFA

The MFA is affiliated with the National University of Bangladesh. The university has designed the course and the curriculum for the academy's 3-year bachelor degree course. The academy at present has 144 cadets; 48 are recruited every year, of whom 20 are allotted the nautical branch, 20 others the marine engineering branch; eight take up marine fisheries.

Subjects for the nautical course: principles of navigation; ocean & practical navigation; terrestrial and coastal navigation; meteorology; general ship knowledge; engineering knowledge; electro-navigational aids; watch keeping; seamanship; signals; ship safety, environmental protection & personal care. In addition, general

Investiture ceremony at the Academy

English, physics and mathematics are taught to meet the requirements of the National University; physical training and parade training are conducted regularly.

The marine engineering course encompasses subjects like mechanics and hydrodynamics; thermodynamics and heat transfer; general engineering knowledge (general & motor); engineering drawing; marine engineering repair & mounting works; marine electro-technology; naval architecture and ship construction; ship safety, environmental protection & personal care. Besides, general English, physics & mathematics are taught to meet the university's academic requirements. Physical training and parade training are also compulsory.

The marine fisheries course includes elements of marine fisheries; coastal aquaculture; applied fisheries (fishing gear & resources management); fish processing engineering; quality control & HACCP management; seamanship; signals; ship safety, environmental protection & personal care. Besides, general English, general zoology and bio-chemistry are taught to meet the requirements of the National University. These cadets, like those of the other two courses, undergo physical and parade training.

All three courses are conducted together with practical work, industrial training and regular field work, as designed by the curriculum body set up by the National University. The course curriculum could be revised from time to time by the board.

Recent achievements of MFA

The course curriculum of the nautical and marine engineering branch has been so designed that cadets are fully equipped to serve both fishery and merchant vessels. Considering the pressing demand for marine officers all over the world, the cadets of MFA are this year being issued with the Continuous Discharge Certificate (CDC), which will facilitate jobs in merchant vessels as well.

Cadets in the Academy's laboratory

To keep pace with technological developments, MFA cadets will be trained in IT. A new IT laboratory with 25 PCs has been established.

The Government has authorized the MFA to train three foreign cadets along with local cadets. From the session starting in 2009, the MFA is expected to receive three overseas cadets from SAARC countries.

Foreign collaboration

To develop infrastructure (like a swimming pool, various simulators, a drill shed for use in wet weather) and to update the course and curricula, the Academy has been trying to obtain collaboration with JICA of Japan. It hasn't succeeded so far. The MFA is still looking for a collaborator.

The MFA and nation-building

In a nutshell: the MFA's output of skilled manpower strengthens the country's capabilities in navigation, marine engineering and fish processing and preservation. It increases production of fish, shrimp and other commercially viable seafoods, and strengthens food and nutritional security.

– *Capt. M Makbul Hossain*
(Principal, Marine Fisheries Academy)

Bay of Bengal News is a quarterly publication of the BOBP-IGO. Readers are invited to send their views and experiences on development of sustainable coastal fisheries in the countries surrounding the Bay. We also solicit scientific/ popular articles on subjects related to coastal fisheries management. The articles should not exceed 4-5 typed pages and preferably with good illustrations/ colour photographs. Scientific articles will be subject to peer review and edited before they are published.

– Editor

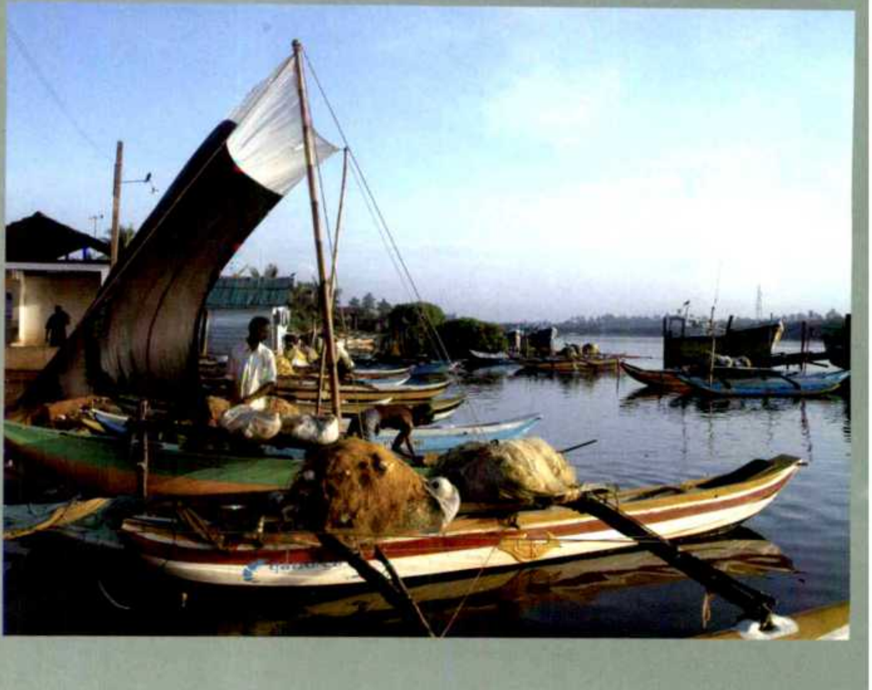
Negombo Revisited

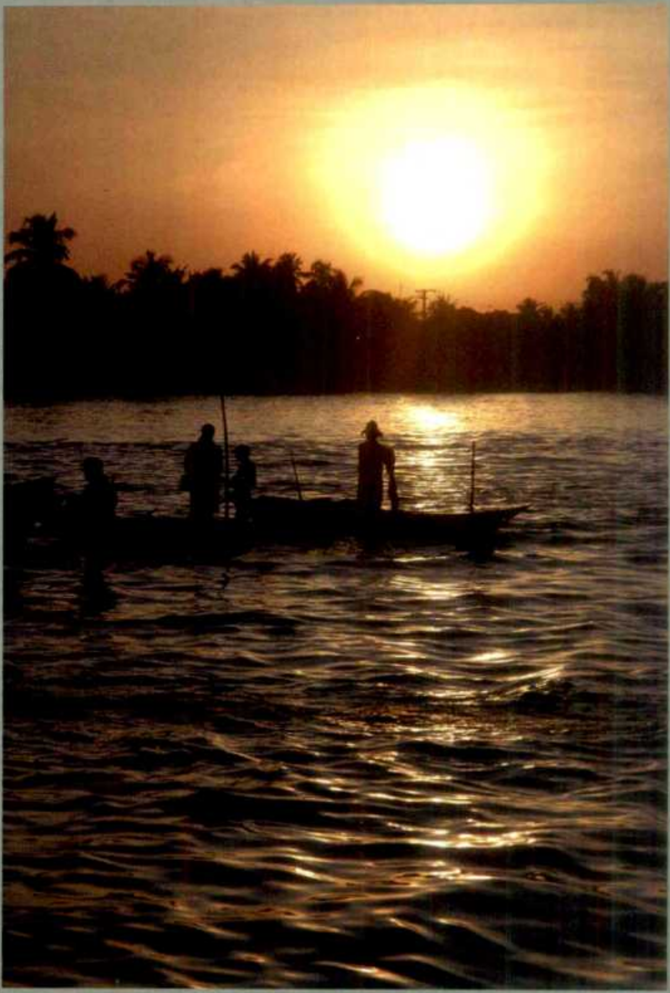
Photo Essay by S Jayaraj

Nearly 27 years ago, the third issue of ***Bay of Bengal News*** (December 1981) carried a feature on "Negombo, yesterday, today and tomorrow" by journalist Neville de Silva. He said that despite the thriving fishing activity, government assistance and a booming tourist industry, "much remains to be done".

Negombo is synonymous with Sri Lankan fisheries. At one time, traditional fishing craft (such as teppams and orus) dominated Negombo. Today, you see greater variety. There are some 400 multi-day boats and 129 single-day boats, some 1 845 fibreglass boats with outboard engines, 2 024 non-motorized traditional crafts, and 34 beach seine boats. As many as 22 fishing methods have been identified. The fish produced includes lobster, tuna, prawn and a variety of small species. The productivity of the Negombo lagoon is high, there is a moderate shrimp and finfish fishery, tuna is captured, so are crabs and many food fish species. Some of the poorer fishermen collect ornamental fish too.

But Negombo's 65 000 strong fishing community (13 000 fishing families) is likely to say, like citizens everywhere, "much needs to be done." Management is the need of the hour. Community-based fisheries management would be ideal, considering that the fishers of Negombo are by and large aware and well-informed.

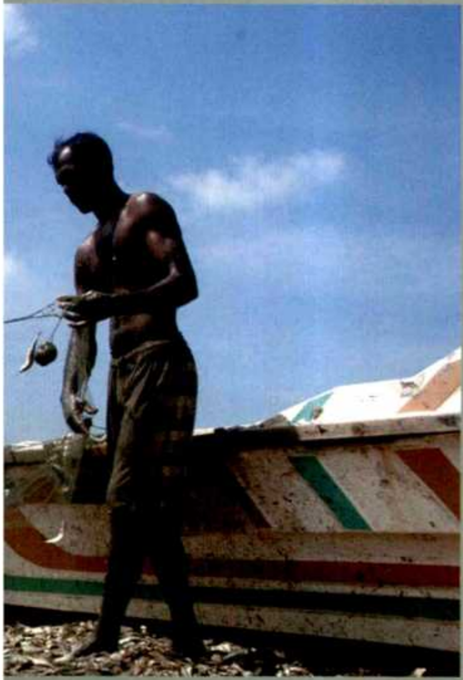


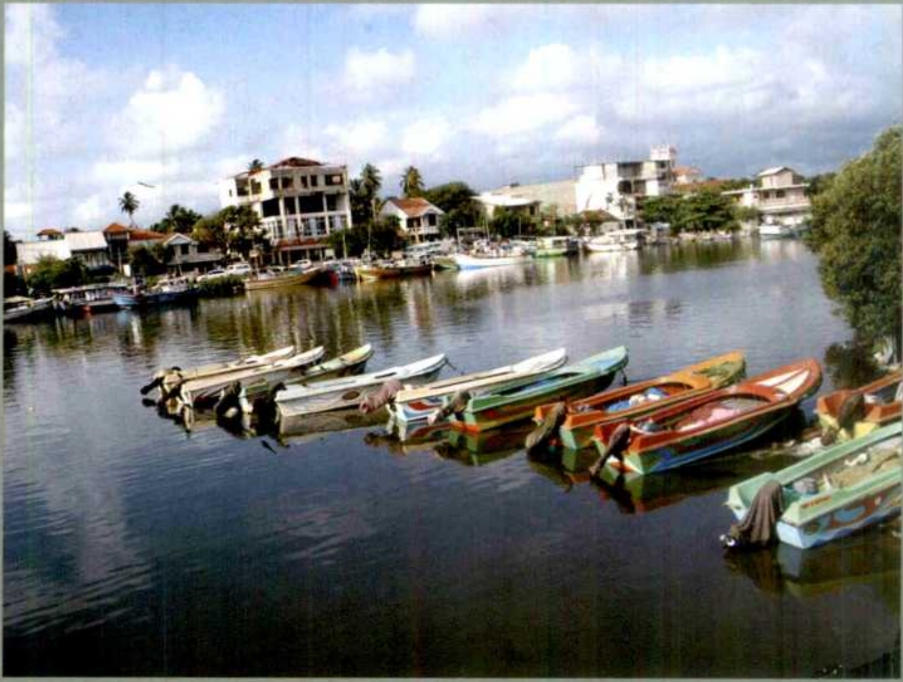


Fish are auctioned on the beaches, also sold in fish markets (Negombo has Sri Lanka's second largest fish market). Most of the fish vending is done by women. They don't go out to fish but are active in processing and marketing, and run their families as well.

Negombo is also known for tourism as much as for fisheries. Its beaches lure tourists into spending a day or two there – to observe the daily fish auctions, meet the colourful fishermen, go on fishing trips into the lagoon, take part in water sports or diving, or gaze at varieties of fish around coral reefs. Some stretches of the beach house hotels, the rest are busy with fishermen.

The pictures in this photo feature provide glimpses of Negombo's thriving fishing community.





"Fisher Safety – there's a long way to go" — *Roger Kullberg*

Roger Kullberg

Roger Kullberg, 44, left his small island residence in an archipelago outside Gothenburg, Sweden, to join the FAO's Safety at Sea project for small-scale fishing vessels (South Asia) at BOBP-IGO as Fishery Officer in September 2007. The assignment is till December 2008.

Roger studied business administration at the University of Gothenburg, then fisheries management, biology and technology at the same university. He attended several courses on safety at sea, both on his own and through the Swedish Maritime Administration.

Roger has worked in the Bay of Bengal region earlier. Nearly 20 years ago, he did a three-month "Minor Field Study" on bycatch from shrimp trawlers operating in Andhra Pradesh. One recommendation from the study was to reduce bycatch by introducing more selective trawl gear. The study was carried out by BOBP in collaboration with the Swedish Board of Fisheries.

The cheerful, ever-smiling Roger talked to ***Bay of Bengal News*** about his previous jobs and the present one.

Q: I understand you came to BOBP from the Swedish Maritime Administration. What were your duties there?

A: I was a Vessel Traffic Systems Operator. My work related to port management and vessel traffic management. I supervised logistics and vessel crew, and coordinated pilot vessels and tugboats. Safety-at-sea activities on the west coast of Sweden were also part of my work.

Q: Can you elaborate on your safety-at-sea activities?

A: I worked in close co-operation with the Maritime Rescue Coordination Centre. I know about IMO regulations and guidelines such as SOLAS, MARPOL and STWC, as well as the Code of Safety for Fishermen and Fishing Vessels. I have long experience with both distress communication and regular VHF communication using IMO's standard marine communication phrases.

I have also helped develop our communication systems with fishing vessels and various clients. I'm familiar with vessel construction, design and stability.

When I was a fisherman in November 1995, the vessel I worked on sunk in the Baltic Sea. I was off that week. The crew of four managed to survive in the cold water because of immersion suits – without which they may have died. (Fishers are expected to carry these suits with them, but they are worn only in an emergency.)

At that time, safety courses for fishermen were not mandatory. But they became mandatory – at the urging of women from the fishing communities – after some more accidents occurred.

Equipment by itself doesn't ensure safety. You may have all the equipment in the world, but without awareness and training, you aren't safe.

Q: You have been a teacher as well. Where?

A: I prepared and conducted training, education and awareness programmes on fisheries among students. I also served as a part-time lecturer at a fisheries high school in Öckerö, Sweden. My main topics were fisheries technology, fisheries management and safety at sea.

Q: Please tell us about your experience as a fisherman.

A: Between 1988 and '99, I worked at various places in both industrial and small-scale fisheries – in Sweden, Norway, Denmark, Latvia, Scotland, Morocco in West Africa. I served as commander, first mate deck hand, engineer and fisherman. I engaged in trawling, purse-seining, longlining, netting, trapping and Danish seining. I worked in the Baltic Sea, the North Sea, the North Atlantic, the Atlantic outside West Africa and in the Bay of Bengal.

Q: What will your duties be in your present job in Chennai?

A: I am settling into my present job in the Bay of Bengal region. I made a field trip to Bangladesh in the second half of January and took part in workshops in Chittagong on safety at sea and on MCS (monitoring, control and surveillance). I visited Kuakata, where I met fishers affected by a severe cyclone in November. I also visited Barisal, Mahipur and Patuakhali. The fishers generally lead a tough life, they don't have either safety equipment or training. A pilot project on safety may be introduced in Cox's Bazaar, Bangladesh

My duties, in co-operation with the FAO project coordinator and the BOBP-IGO director, will be to develop and improve accident reporting and analysis systems, recommend better distress communication systems, conduct baseline surveys to review the design, construction and status of small fishing vessels in the region, help organize workshops, assist member-countries in improving fisheries management systems.

We need to make the fisherman's working environment safe and comfortable.

There's a long way to go!

Gulbrandsen Re-visits Fisheries Centres of South India

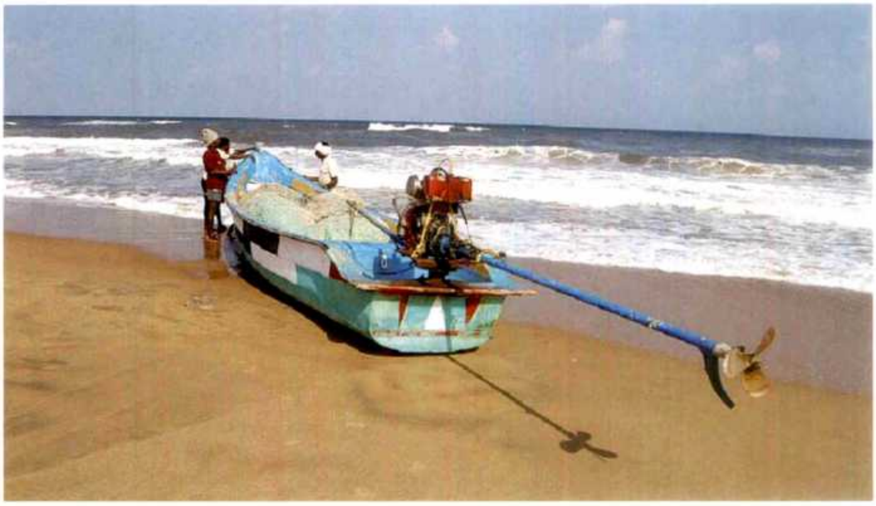
Oyvind Gulbrandsen was profiled by ***Bay of Bengal News*** 27 years ago – in the very first issue of BBN (January 1981). That article focused on Gulbrandsen's work as consultant in designing BOBP's beachcraft development programme, which was a major activity during the Programme's first decade.

That article described Gulbrandsen's early work for the FAO in designing boats in Western Samoa, and his travels all along India's east coast in March 1979 to study the small-scale fisheries scene as preparation for designing a beachcraft programme for small-scale fishers.

R Ravikumar, then BOBP's fishing craft specialist, said of Gulbrandsen: "I admire the meticulousness with which Oyvind studies the local ethos, the local environment and capability before starting a design. There is always a sound rationale for his decisions."

Fast forward to November 2007. Oyvind Gulbrandsen revisited Puri, Visakhapatnam, Kakinada, Cuddalore and Tuticorin in India. He also visited Negombo, Beruwala and Galle in Sri Lanka. His tour was to study the status of safety of fishing vessels, identify key problems, and collect baseline information for the IMO component of the ongoing FAO-SIDA safety at sea project, being executed under the BOBP-IGO umbrella.

He met scores of fishers, boatbuilders and officials with whom he had worked in the past for BOBP. Gulbrandsen will use his observations and findings to prepare technical guidelines for fishing vessels in India and Sri Lanka – an update of his very popular "Safety Guide for Fishing Boats" BOBP/MAG/16.



A traditional Andhra boat with an outboard motor fitted with long-tail propulsion unit

Tuticorin, Tamil Nadu fishers back from a good fishing trip

Mr Gulbrandsen inspecting a FRP boat in Chinna Neelangarai, Tamil Nadu

"It is always a joy to come here," said Gulbrandsen. "Fisherfolk in this part of the world are the most friendly and happy people that I have encountered anywhere." Gulbrandsen took masses of photographs of fishers and fishing boats with his compact Fuji 8 mega pixel digital camera to visually document his findings.

He spoke about what he saw and learned on his east coast tour at the National Workshop on Safety at Sea organised by BOBP-IGO in Chennai on 3-4 December, 2007.

"Imagine fishers battling strong waves and rough weather on a dark night. It's a tough life," Gulbrandsen observed. "We must make his life easier and safer, and of course prevent him from drowning."

"I was here last after the 1996 cyclone hit Andhra Pradesh and more than 500 fishers were killed. Since then, there have been some positive steps. A key word is communication. Even small-scale fishers carry mobile phones. These have their limitations but are better than nothing. They are useful when fishers have to be warned about approaching cyclones."

Gulbrandsen said he noticed that trawlers in Andhra Pradesh and Tamil Nadu have some equipment such as echosounders. But there were no navigation lights, very few life floats, not a single life jacket. "Formulating sea safety regulations is important, but there is no point if they are not implemented, Gulbrandsen noted. He added that the trawlers could do with a lot of improvements to engine installation and fittings."

Gulbrandsen was critical about the use of 'long-tail' propulsion units on boats operating from surf beaten beaches as they could cause fatal accidents to shore crew. "Long-tail engines have been used with thousands of boats provided by donors. In calm conditions these are good, but there is a problem during surf-crossing." Deaths have occurred because of fishers being hit by the propellers.

Gulbrandsen's main observation related to the large-scale introduction of FRP craft in Tamil Nadu after the December 2004 tsunami which devastated fishers, their boats and livelihoods.

Most of these craft had been financed by donors who wanted to do their bit for tsunami relief. But the construction quality of the craft was poor and the boats started leaking very soon. They had been made by inexperienced builders who knew little about FRP. "I wish donors who provided these boats assist fishers with the repairs." He added that concrete steps were needed to assist and train boatbuilders, and improve both their awareness of regulations and compliance with them.

"In a wooden plank you notice a problem immediately, not so with an FRP craft. FRP has come to stay, so it is vital to improve the skills of boatbuilders," Gulbrandsen said. "BOBP introduced the first FRP fishing boat to the east coast through the IND-20 beachlanding craft designed by R Ravikumar. It is still being used in Puri, and has a safe installation for surf-crossing, which could be demonstrated any time to those interested."

Referring to Sri Lanka, Gulbrandsen said he had visited the Island after the tsunami in connection with rehabilitation work. He didn't notice any major change there during his current trip.

Ideas Abound at Sea Safety Workshop in Chennai

(Continued from page 33)

On the basis of the group discussions, the workshop adopted the following three action points for implementation of the Safety at Sea Project in India:

- All pilot-scale activities will be carried out in a fishing harbor/ fish landing site – such as Chennai in Tamil Nadu, Visakhapatnam in Andhra Pradesh.
- A committee comprising nominees from national fishery agencies, district fishery bodies, fishery cooperative societies, local leaders of influence, and women from the fisher community will be formed to oversee the pilot activities
- A baseline survey will be conducted to assess present knowledge and awareness of safety at sea. A consultant will conduct the survey on the basis of a questionnaire prepared by BOBP-IGO for each category of stakeholder. This will serve as a benchmark for monitoring the effectiveness of the awareness campaign.

During the workshop's concluding session, Mr Per Danielsson said that the poor quality FRP boats constructed during the post-tsunami period in Tamil Nadu should be repaired. Boats beyond repair should be recalled. Insurance for fishing boats should be linked to their construction standards.

Mr Seshadri said that liquor is a major problem in the fishing community, and compounds other social problems. The open-access nature of fisheries needs to be urgently addressed. There are too many boats; they must be regulated if fisheries is to be sustained.

Mr Seshadri further said that analyses of all fishing-related mortalities are a must – we must go into the cause before looking for the solution. He referred to the three E's of safety – engineering, education & enforcement. All three factors must be studied and addressed simultaneously to improve the safety and health of small-scale fishers.

He thanked the BOBP-IGO for organizing the workshop and all participants for smooth conduct of the workshop. Dr Y S Yadava proposed a vote of thanks.

Regional Workshop on Monitoring, Control and Surveillance – Chittagong, Bangladesh, January 2008

Effective MCS (monitoring, control and surveillance) is essential for sound policies to conserve and manage fisheries resources. Some of the main constraints to MCS in the Bay of Bengal region are lack of accurate statistics concerning small-scale fisheries; lack of a scientific information system; inadequate trained manpower; lack of awareness at the community level of the need for MCS; landing centres that are remote and inaccessible; lack of supporting legislation; and inadequate funding.

These are some issues that will be discussed at a Regional Workshop on Monitoring, Control and Surveillance to be held in Chittagong, Bangladesh, from 16 to 18 January, 2008. Representatives from Bangladesh, India, Maldives and Sri Lanka will attend. The workshop will review existing marine fisheries management programmes in member-countries, current licensing and registration procedures, and practices and fisheries legislation. It will assess the existing capacity for MCS, identify institutional requirements necessary within the Department of Fisheries in each country, prepare and outline procedures for a fisheries MCS programme. It will discuss the preparation of training and extension materials.

National Workshop on Safety at Sea in Chittagong, Bangladesh, January 2008

A National Workshop is to be organised during 21-22 January, 2008, in Dhaka, Bangladesh, in co-operation with the FAO and the Ministry of Fisheries and Livestock, Bangladesh. The workshop will explain the objectives and activities of the SIDA-funded FAO-executed project "Safety at Sea" in co-operation with the BOBP-IGO. It will evolve a work plan in co-operation with stakeholders, identify a fishing centre for pilot activities, and the agencies and personnel who will form a committee to facilitate project activities.

Regional Consultation on Management Plan for Hilsa fisheries – Barrackpore, India, March 2008

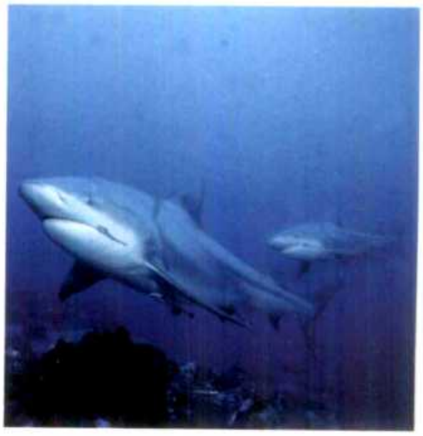
The hilsa is an icon of Bengali cuisine; the hilsa fishery is also an important source of food, nutrition and livelihoods in the coastal, estuarine and inland areas of Bangladesh, India and Myanmar. But the hilsa is being depleted and stocks are declining. It is believed that both natural and anthropogenic impacts are responsible. Conservation and management of the hilsa fishery is a serious and urgent issue.

A Regional Consultation on preparation of a management plan for hilsa fisheries is to be held on 14 and 15 March, 2008 at Barrackpore (Kolkata), India, in co-operation with the Ministry of Agriculture, Government of India, and the Central Inland Fisheries Research Institute, Barrackpore. Representatives from Bangladesh, India and Myanmar will attend. The Consultation will review the current status of hilsa fisheries in the Bay of Bengal region as well as socio-economic data, set up a technical committee to prepare a comprehensive report, and outline management aspects essential for a management plan.

Regional Consultation on Preparation of Management Plans for Shark Fisheries – Beruwala, Sri Lanka, March 2008

Sharks have been a major fishery in India, Maldives and Sri Lanka for centuries. Sharks are commercially valuable; in fact every part of shark has economic utility. Forty seven species of shark occur in the seas in India, while three types of shark fishery are carried out in the Maldives – the reef shark fishery, oceanic shark fishery and the deep water gulper shark fishery. But the shark is under threat. Many species of shark are now in the IUCN (International Union for Conservation of Nature) red list.

A Regional Consultation on Preparation of Management Plans for Shark Fisheries will be organized from 24 to 26 March 2008 in Beruwala, Sri Lanka, with representatives from India, Maldives and Sri Lanka. The Consultation will review existing data on shark fisheries in the region, review socio-economic data, outline important management aspects essential for formulating a management plan, and set up a technical committee to compile, collate and prepare a comprehensive report on shark fisheries of the region.



Popularizing CCRF through Posters

In 2006, the BOBP-IGO brought out a set of 12 posters depicting the messages of the Code of Conduct for Responsible Fisheries through attractive sketches and simple and catchy messages, such as Enhance fish stocks. Ban destructive fishing practices. Avoid overfishing. Keep fishing harbours clean. Encourage People's participation. Promote co-management. Ensure safety and health of fishers.

The original posters (in English) are immensely popular with the stakeholders in the member-countries. To ensure wider reach of these posters, the BOBP-IGO has translated the entire set of posters into Tamil (for use of Tamil speaking fishers in India and Sri Lanka), Telugu (for Telugu speaking fishers in India), Dhivehi for Maldivian fishers, Sinhalese for Sri Lanka and Bangla (for Bengali speaking fishers in India and Bangladesh).

These posters will be widely distributed in the member-countries. If you need a set of posters, please write to info@bobpigo.org

பொறுப்பார்ந்த மீன் வள நடத்தை விதித் தொகுப்பு

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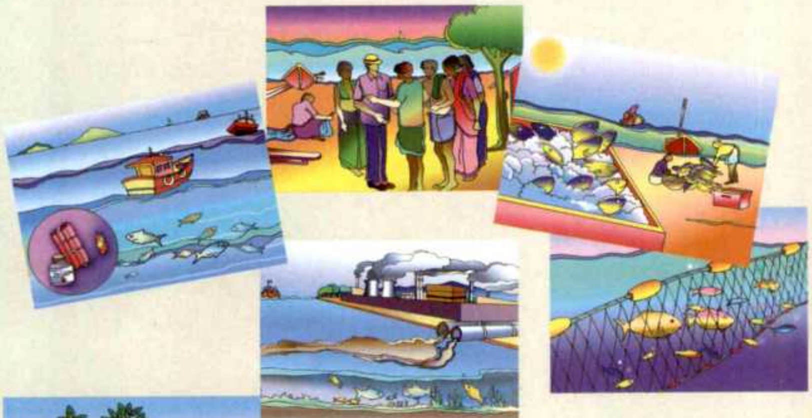

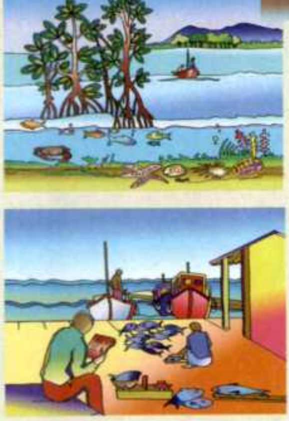

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দায়িত্বশীল মৎস্য আহরণের আচরণবিধি

যৌথ-পরিচালনা উদ্বুদ্ধকরণ

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MCS in Small-scale Fisheries

Regulating the unregulated

The seas, once - abundant with fish, are drying up. Once - ambitious fisheries planners are agonising over regulation and management. Once - carefree fishers are brooding over falling catches and incomes - and their own future. This issue of BBN focuses what will best help the seas, the fishers and the planners - MCS (monitoring, control and surveillance), the key to success in fisheries management.

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MCS in Small-scale Fisheries

Regulating the unregulated

MCS (Monitoring, Control and Surveillance) is perhaps the most important three-letter term in fisheries today. Without MCS, management – an urgent priority in fisheries everywhere – would be ineffective. This editorial discusses some of the issues relating to an effective MCS system for fisheries in countries around the Bay of Bengal.

Dwindling resources, falling fish catches and incomes, concerns about sustainability, calls for a "paradigm shift" in mindset from production to management – the story is universal.

Management is the gospel that fisheries departments and institutions preach but fishers small and big ignore. Management policies are inadequate; compliance levels are low; enforcement is poor.

For all three to improve, Monitoring, Control and Surveillance (MCS) has to get better. It's a potent tool of governance in fisheries, but like governance itself, it is easier to profess than to implement. "Monitoring" entails systematic collection, measurement and analysis of data on fishing activities. "Control" refers to the conditions laid down under which resources can be harvested. "Surveillance" ensures that fishers and other players comply with laws and regulations.

MCS systems have mainly been designed for the industrial fisheries of developed countries. Special MCS systems are needed for small-scale fisheries of developing countries because of its special character – open access, multi-species, multi-gear, with thousands of small low-cost fishing units operating from beaches and landing fish at numerous small and remote landing centres. The process of setting up an effective MCS system is slow, costly, and full of hurdles.

To help the process, the BOBP-IGO held a three-day workshop on MCS in fisheries in Chittagong, Bangladesh, in January 2008. Leading fisheries officials from BOBP-IGO member-countries (Bangladesh, India, Maldives, Sri Lanka) took part, besides experts and observers. The workshop's "Chittagong Resolution" urged that MCS should be integrated into every member- country's fisheries policy, its regulatory and managerial frameworks. Education, training and awareness programmes and media mobilization should be a part of the process.

Here are some insights and learnings from the workshop.

- An MCS system may be perceived as costly, but the cost of not managing the resource is far higher. This said, the MCS system should be designed to be cost-effective. It should encourage compliance, rather than demand enforcement. Further, the cost of conservation should not exceed the economic benefits from marine resources. The fisheries department or the management authority should examine all practical options for sharing the cost of management with industry. Likewise, information-sharing among all stakeholders is another practice that should be institutionalized.
- MCS in small-scale fisheries has to confront unique constraints:
  - Lack of accurate statistics in the small-scale/ artisanal sector.
  - Lack of a scientific information system.
  - Inadequate trained manpower at both management and operational levels.
  - Lack of awareness at the community-level of the need for MCS.
  - A large number of inaccessible landing places along the coast.
  - Lack of supporting legislation to implement MCS.
  - Inadequate funding for MCS.
- A sound MCS system can be based on either a preventive approach or an enforcement approach. The preventive approach entails measures to control access, such as licensing. The enforcement approach entails penalties on law-breakers so that law-abiding is seen as not merely wise or correct but as advantageous. But strong political will and government support are needed for firmness in enforcing penalties.
- All fishing vessels must be registered. Procedures for registration and licencing must be streamlined. In some countries, registration and licencing are seen as cumbersome multi-window processes. This discourages compliance. Further, registration systems should be uniform throughout a country.
- A Vessel Monitoring system (VMS) is an essential MCS tool. VMS enables accurate and timely information about vessel location and activity through transponders on the vessels and associated paraphernalia.

However, VMS is practical only for a large industrial fishing fleet. For small-scale fisheries, colour coding of fishing fleets on the basis of their place of origin and area of operation, and display of flags with registration numbers, are necessary measures. Random sampling of catch is essential – the enforcing authority ought to use modern communications technology to make the process effective. Better two-way communication systems in all fishing vessels is essential.

- Limits should be imposed on fishing effort through access regulations (licensing of fishing vessels, for example), closed seasons, closed areas and gear restrictions.
- A comprehensive stock assessment is essential to ensure sustainable exploitation of resources, and also work out optimum fleet size by area and species. This may help reduce conflicts as well.
- The MCS authority should probe and address the reasons for non-compliance with regulations – apart from that of inadequate enforcement. It could be lack of awareness, inconsistencies in regulations issued by different ministries, a culture where community solidarity is a

International MCS Network

The International Monitoring, Control, and Surveillance Network for Fisheries-Related Activities (www.imcsnet.org) helps in the global battle against IUU (illegal, unreported and unregulated) fishing. Created in 2001, the network facilitates collaboration between MCS professionals.

Members of the network are national organizations which have been authorized to co-operate with organizations elsewhere to prevent, deter and eliminate IUU fishing. The network, which now has some 50 members, provides training, serves as a forum for professionals to meet and discuss MCS, and maintains a database of contacts and information for member-countries.

Why is such a network needed? Comprising over 70% of the earth's surface, the oceans feed the world. IUU fishing takes place in all oceans; while fisheries-related corruption and crime occur on land. Identifying and pursuing criminals over large areas requires resources and effort beyond the reach of any single nation. Developing nations are particularly vulnerable to incursions in their waters.

The Network's objectives:

- Efficient information exchange.
- Preparing analyses and studies related to IUU fishing.
- Recognizing the dangers of IUU fishing and seeking common solutions.
- Facilitating communication with members and between them.
- Develop capabilities among member nations to work regionally and globally to prevent, deter and eliminate IUU fishing.
- Training of MCS officials in member nations to improve their effectiveness, skills and capacity to address IUU fishing.

The Network conducted the first Global Fisheries Enforcement Training Workshop in Kuala Lumpur in 2005 and the second in Trondheim, Norway, in August 2008.

stronger force than government edict.

- Legislation on MCS in the region is either poor or inadequate. It should be revised. It is widely believed that fisheries laws are often complex, difficult to understand and implement. Those concerned should consult a wide range of stakeholders in formulating laws that are simple and clear and relatively easy to enforce.
- Co-operation and support from advanced countries for an MCS system should be regarded as a priority – on technology, on search-and-rescue systems, on strengthening the Coast Guard, on curbing illegal fishing, on a vessel monitoring or vessel tracking system. The Code of Conduct for Responsible Fisheries suggests such co-operation.
- MCS systems must be local-specific, and take account of prevailing cultural, financial and human factors. The focus should be on improving data collection, strengthening local awareness of the need for conservation and management, and encouraging fishers as whistle-blowers who will report infringements.
- MCS has to be a co-operative effort with industry and the entire fisher community. It can't succeed if it's just government-driven. Decentralizing management, and moving towards co-management and community management, is the way to the future.
- CBFM (community-based fisheries management) structures at the community, district, regional and national levels should be tapped for MCS activities. In fact, fishers should be able to help enforce MCS, with NGOs serving as facilitators, if an appropriate legal, management and financial framework is devised.
- The MCS authority could conduct a micro-level exercise to determine the norms for scientific and environment-friendly MCS, depending on the type of craft, fish species, time of the year and gear type. This should be carried out and published. Accordingly, an area-specific management plan could be set out.
- Illegal fishing should be combated through port state measures such as inspection of gear and catch onboard arriving vessels, and inspection of documents.
- "Sustainability" may have neither meaning nor relevance for artisanal fishers who live from day to day. It would be relevant, however, if fishers are provided with useful information – on fish abundance by area, weather forecasts, market prices, safety at sea, etc. In Maldives, for example, fishing forecast information is provided free of charge exclusively to registered vessels.
- Regional cooperation can strengthen understanding and knowledge on all MCS-related issues and lower costs as well. The 'Chittagong Resolution' on MCS is a good beginning and must be taken further.
- Ultimately, MCS confers manifold benefits that go far beyond resources. For small-scale fisheries, it could mean more accurate resource mapping; a better insurance deal; greater safety; more stable incomes; greater employment opportunities and a win-win situation for all.

At the national level, a strong MCS in fisheries could even enable more effective operations against terrorism, drug-peddling, arms smuggling and other social evils.

– Y S Yadava

Paintings by school children in India, Maldives and Sri Lanka depicting post-tsunami reconstruction.

CICEF - India's Nodal Agency for Development of Fishery Harbours

When was CICEF set up and why? What is the mandate and vision of CICEF?

On January 10, 1968, the Pre-investment Survey of Fishing Harbours (PISFH, the precursor to Central Institute of Coastal Engineering for Fishery or in short CICEF) was set up in Bangalore by the Ministry of Agriculture in collaboration with the FAO for a period of five years. It conducted studies and site surveys for development of minor fishing harbours, advised on site construction, and helped develop the fisheries potential of major commercial ports.

After FAO assistance ceased, the organization received technical assistance (equipment and consultancy services) from January 1974 for two-and-a-half years from the Swedish International Development Authority (SIDA).

In August 1983, PISFH was renamed the Central Institute of Coastal Engineering for Fishery in view of changing trends in maritime fisheries. The Institute was asked to help develop brackishwater fish farms in cooperation with state governments under a UNDP project, in addition to existing activities.

The Institute's work in coastal aquaculture received a further thrust through UNDP/FAO assistance for five years from 1986 to 1991 – mainly in the form of equipment and consultants for development of shrimp farms and hatcheries. The Institute also implemented the World Bank-assisted Shrimp and Fish Culture Project in West Bengal, Orissa and Andhra Pradesh for eight years (1992 to 2000).

Presently, under the Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, CICEF carries out the entire gamut of activities relating to fishery harbours – reconnaissance surveys, investigations, drawings and construction, advice on engineering and economics, monitoring construction.

Vision

The socio-economic context of CICEF's operations is challenging. Nearly 3.57 million fisherfolk operate from India's 3 272 coastal fishing villages and 1 343 fish landing centres. The fishing fleet is varied – more than one lakh traditional craft, more than 76 000 motorised traditional craft, nearly 60 000 mechanised fishing vessels.

The fishing industry is undergoing a notable transformation – in the size of mechanised fishing vessels – to make them suitable for offshore/ deep-sea fishing. Statistics show that mechanised fishing vessels have been increasing annually at the rate of 10 percent.

The landing and berthing facilities created so far in the country can accommodate only 25 percent of the active fishing fleet. Result: overcrowding and congestion. Some of the harbours lack maintenance, many of the facilities are in utter disrepair because of overcrowding. With fish importing countries

Mr K Omprakash, 59, has been Director of CICEF from August 1995. A graduate in civil engineering (University of Madras), he has a post-graduate diploma in hydraulic engineering (Delft University of Technology, Netherlands). His experience in marine fisheries spans 35 years. He has specialized in fishery harbours and has served as fishery harbour consultant to Iran under an FAO-sponsored TCDC (Technical Co-operation among Developing Countries) programme.

Mr Omprakash has received training in brackishwater aquaculture at the National Brackishwater Aquaculture Technology Research Centre at Pagbilao, Quezon, Philippines (Sept-Oct 1991). He also did a short course on shrimp farm management at the Asian Institute of Technology, Bangkok (May 1994). He visited Japan in April 1998 and January 1999 in connection with the procurement of a dredger as part of Japanese grant-in-aid.

Joining CICEF as Assistant Director in 1972, he rose to the position of Director in 1995. He also did two short stints elsewhere in government during this period – as Deputy Commissioner (Fishery Harbour) in the Ministry of Agriculture (1992-94) and as Chief Engineer in Inland Waterways Authority of India, Ministry of Surface Transport (1994-95).

imposing stringent international standards on hygiene, HACCP and ISO 9000, better harbours and more harbours are imperative.

Natural catastrophes such as depressions, storms and cyclones are regular occurrences on both the east and west coasts. Cyclones are particularly frequent, leading to heavy loss of life and damage to fishing vessels. This underlines the need for more sheltered harbours for fishing boats.

Existing fishery harbours – 41 commissioned, 20 under construction – are grossly insufficient for the ever-increasing fishing fleet. The number of harbours should be at least tripled during the next 10 to 15 years. It is also necessary to rehabilitate harbours and fish landing centres (FLCs) that have become defunct or have outlived their useful life span.

CICEF is presently identifying potential sites for locating fishery harbours and FLCs in the various maritime States and Union Territories (UTs).

Given reasonable facilities, the FLCs and minor fishery harbours could contribute significantly to the overall national economy and to their respective regions and could enable the socio-economic uplift of fisher populations.

What is the staff strength of CICEF? What are its facilities?

The Institute is headed by the Director. The sanctioned staff strength is 47 (30 technical, 11 non-technical, 6 administrative personnel). They belong to three divisions – technical, economic, administrative.

The Institute's inter-disciplinary team comprises engineers and economists with specialised knowledge and experience relating to pre-investment studies, engineering and economic investigations, techno-economic feasibility reports for development of fishery harbours, FLCs and brackishwater shrimp farms.

CICEF in action.

The Institute has had its own building in Bangalore since August 2003, situated on 0.755 acre of land, with a built-up area of 1 472 sq. m. The Institute is well-equipped in terms of equipment and other paraphernalia to conduct surveys and technical investigations.

What have been the foremost achievements of CICEF in recent years, including support for post-tsunami reconstruction?

Fishery Harbours

- Till the end of March 2008, the Institute had carried out engineering and economic investigations for the development of fishery harbours/ FLCs at 76 sites and prepared project reports for 75 sites.
- On the basis of project reports prepared by the Institute, the Ministry of Agriculture has sanctioned 61 fishery harbours. Of these 41 have been commissioned and 20 are under various stages of construction.
- The Institute has monitored the construction of fishery harbours and FLCs sanctioned by the Ministry of Agriculture under a Centrally Sponsored Scheme. It has provided technical guidance to the maritime States/UTs in speedy project implementation.

Fish Landing Centres

The Institute has identified sites for the development of FLCs. Reports have been prepared for 10 sites in Tamil Nadu, four in Andhra Pradesh, three in Kerala, 20 in Andaman and Nicobar islands. The governments concerned are taking action on the basis of these reports.

Master Plan

Detailed master plans for fishery harbours and FLCs have been prepared for all maritime States and UTs and submitted as vision documents to them and to the Ministry of Agriculture.

Brackishwater Shrimp Farms

- The Institute has so far reconnoitered 66 200 ha of brackishwater shrimp farm area. Investigations were carried out in 15 584 ha of water spread area in the maritime States of Gujarat, Maharashtra, Goa, Kerala, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal.
- During the period 1986 -1991, four pilot brackishwater shrimp farms and a shrimp seed hatchery were developed under UNDP assistance.
- Under the World Bank-assisted Shrimp and Fish Culture Project, the Institute served as a Nodal Agency for the development of

CICEF in the field.

brackishwater shrimp farms. It was associated with four projects in West Bengal (Canning, Dighirpar, Digha and Dadanpatra Bar), one project in Orissa (Jagatjore/Banapada) and one project in Andhra Pradesh (Bhairavapalem).

Tsunami Rehabilitation

The tsunami struck in December 2004. The Institute inspected affected fishery harbours and FLCs during January 2005 in Tamil Nadu, Kerala and Puducherry and a report was submitted to the Ministry of Agriculture.

Please tell us about the foreign collaborations of CICEF.

The Institute has received technical assistance and expert consultancy services for the development of fishery harbours and for brackishwater shrimp farms and hatcheries from i) the FAO/UN, ii) SIDA, iii) UNDP and iv) World Bank.

How has CICEF been able to contribute to food and nutritional security, human resource development, and policy development in marine fisheries?

Following the creation of fishery harbours and FLCs through CICEF, motorised and mechanised fishing vessels have been landing their fish more systematically and hygienically. International standards such as HACCP and ISO 9000 are being applied strictly. In consequence, the quality of fish has improved and spoilage has been reduced. This has contributed significantly to the national economy in the areas of food and nutrition. Employment opportunities have gone up manifold. Engineers have been trained to conduct investigations and prepare project proposals.

As regards policy development on marine fisheries, the Ministry of Agriculture is implementing a centrally sponsored scheme on "Development of Marine Fisheries, Infrastructure and Post- Harvest Operations". Establishment of fishery harbours and FLCs is part of this scheme. The objectives of the scheme are:

- Providing infrastructure facilities for safe landing, berthing and unloading of fish catches of mechanised fishing vessels, traditional fishing craft and deep sea fishing vessels.
- Construction of new major fishing harbours in association with maritime State Governments, Port Trusts and UTs.

On the basis of techno-economic feasibility reports (TEFRs) prepared by CICEF, the Ministry has accorded administrative sanction and provided central assistance as follows:

(i) 50% of the project cost to maritime State Governments and 100% to UTs for the construction of minor fishery harbours and FLCs;

(ii) 100% assistance to maritime States, UTs, Port Trusts and Fishermen Associations for construction of major fishery harbours;

(iii) 50% assistance for the construction of minor fishery harbours and FLCs on a Build-Operate-Transfer (BOT) basis;

(iv) 50% assistance to maritime States and Port Trusts for repair and renovation/modernization of existing fishery harbours and FLCs, and 100% assistance to UTs.

What are some of the major constraints CICEF faces?

Technical staff trained earlier in India and abroad have either retired or are likely to retire shortly. Technical skills now available with the Institute are limited; there is a shortage of technical manpower. At present, the Institute undertakes only engineering and economic investigations. There is no expertise available for environmental and mathematical model studies to enable complete project reports. Such studies are being carried out by maritime States/ UTs through consultants and research institutes. Consultants are also being used for the development of fishery harbours and FLCs. Some maritime States have acquired expertise in the formulation of project proposals.

What future do you envisage for CICEF?

CICEF has a bright future. We are equipped to face the challenges we are entrusted with in the development of fishery harbours and landing centres in the country.

Bangladesh National Workshop Adopts Action Plan on Monitoring, Control and Surveillance

Fifty-one persons from 21 national, regional and international fisheries organizations took part in the National Workshop on Monitoring, Control and Surveillance (MCS) in Marine Fisheries in Bangladesh, held on June 7-8, 2008 in Cox's Bazar.

It was organized by the Danida-funded project "Strengthening Institutional Capacity of the DoF (SICD)" in coordination with the Ministry of Fisheries and Livestock (MoFL), and the BOBP-IGO.

Mr Nasiruddin Md Humayun, Project Director, SICD Project, welcomed participants. Describing the current crisis in global fisheries, Mr Humayun said that fish stocks had got depleted in many parts of the world because of over-exploitation, habitat destruction, industrial pollution and waste-dumping into marine waters.

In response, fisheries authorities have been regulating the fishing fleet; introducing gear restrictions, closed areas and closed seasons; and registering and licensing small-scale fishing operations, said Mr Humayun.

The National Fisheries Strategy formulated by Bangladesh in 2006 could be effective only if MCS was reviewed and strengthened, Mr Humayun said.

Mr Humayun thanked the chief guest, Mr Parikshit Datta Choudhury (Joint Secretary, MoFL) and the chairperson – Mr Md Rafiqul Islam, Director General, Department of Fisheries (DoF) – for their support to the workshop. He thanked Dr Yugraj Singh Yadava, Director, BOBP-IGO for technical and financial assistance to the workshop; the Royal Danish Embassy, Bangladesh, for financial support and cooperation; and Mr Bundit Chokesanguan, Director (Training), SEAFDEC.

Mr Sajjadul Hassan, Deputy Commissioner, Cox's Bazaar District, Bangladesh, said that the potential of marine fisheries in Bangladesh was huge. Effective management was essential to tap the resources in a sustainable manner. "While doing so, the occupational hazards faced by the fishers need to be minimized", said Mr Hasan.

Declaring the workshop open, Mr Parikshit Datta Choudhury (Joint Secretary Fisheries), said that MCS in fisheries had been neglected in Bangladesh. An effective MCS programme was needed to strike a balance between conservation and sustainable exploitation.

The proposed action plan should be based on the Chittagong Resolution adopted by the BOBP-IGO member-countries in January 2008.

Mr Md Rafiqul Islam, Director General, DoF, said that capture fisheries in Bangladesh were stagnating because of lack of a reliable database, over-exploitation of some stocks and under-exploitation of others, inadequate MCS, plus the impact of global warming and climate change.

He suggested demarcation of the EEZ of Bangladesh. An effective information network; a central data base for information on the weather and on fauna and flora; a strong MCS system; management plans for shared stocks; marine parks; joint stock survey programmes; protection of nursery grounds; and a ban on capture of juveniles of fin and shellfish species – these were some other suggestions.

Dr Yugraj Singh Yadava made the keynote presentation on

Participants at the National Workshop on MCS.

"Monitoring, control and surveillance in small-scale fisheries - guiding principles and practices". Stressing the uniqueness of fisheries to the national economy of Bangladesh, Dr Yadava said that some 1.77 million fishers were active in the primary sector and 67 300 in the secondary sector. Fisheries contributed significantly to the national GDP and to export earnings.

He said that the coastal marine fishery portrays a picture of unregulated access, overcapacity, low catch per unit effort and fishing rights conflicts. Most fishing communities rely almost entirely on fishing for their livelihood, and lack alternatives. A large proportion of fish stocks – both marine and inland – are fully exploited, over-exploited or depleted. While the commercial trawl fishery is regulated to a certain extent, the small-scale/ artisanal fishery is almost unregulated.

The DoF awards fishing licenses only to registered boats. But it's the MMD that registers the boats and only about 10 percent of the mechanized boats get registered. This means that a large number of boats are unlicenced and not monitored. The DoF has no magisterial power; fisheries personnel depend on the executive and the Police Department to enforce the Fisheries Act.

The MMD is ill-equipped to enforce existing legislation, as it has only two offices all along the coast. The Bangladesh Coast Guard, set up in 1994, is mandated to protect national interests in the maritime zones of Bangladesh and prevent illegal fishing. But the Coast Guard is ill equipped as well, it needs more manpower, more patrol boats, more equipment.

Small-scale fishing communities are illiterate, and provisions of the Fisheries Acts and Regulations are unknown to many of them. An effective and implementable legal framework is a pre-requisite to management and conservation of fisheries resources.

The main constraints to MCS in Bangladesh are lack of accurate fisheries statistics and a scientific information system; inadequate trained manpower at both management and operational levels; lack of awareness at the community-level of the need for MCS; a large number of inaccessible landing places; lack of supporting legislation to implement MCS; a multiplicity of agencies and lack of well-defined roles and jurisdictions; and inadequate funding for MCS.

Community motivation is the most important step for effective implementation of an MCS policy, Dr Yadava said. Joint effort by all stakeholders and coordination among them is essential; MCS can't be practiced in isolation by the Government.

Dr Yadava said that the Chittagong Resolution of January 2008 on MCS had recommended action plans for implementing MCS and for strengthening national agencies. The current workshop is aimed at formulating such an action plan to guide MCS in Bangladesh.

Dr Yadava called for a paradigm shift – from a regime of open access in marine fisheries to limited and controlled access, and allocation of rights to user groups. Small-scale fisheries can benefit immediately from successful MCS measures through (i) effective demarcation of fishing areas, (ii) data strengthening, (iii) target fishing through resource mapping, (iv) sea-safety, (v) reflection of their interests in fishing policy, (vi) stabilization of catch per boat and hence income, and (vii) effective land and sea-based monitoring systems.

Mr Md Kabir Ahmed, District Fisheries Officer, Cox's Bazaar, proposed a vote of thanks at the end of the inaugural session.

Technical Presentations

Mr Bundit Chokesanguan, Director (Training) at SEAFDEC, Thailand, provided an overview of MCS in fisheries in Southeast Asia. He said that small-scale fisheries were dominant in the region, barring Thailand, where industrial fisheries had grown faster.

Every coastal state in Southeast Asia faces theft of resources from Illegal, Unreported and Unregulated (IUU) fishing made possible by lack of MCS, the speaker said. IUU fishing undermines efforts to conserve and manage fish stocks. If this practice is not curbed, vulnerable stocks can't be rebuilt, said Mr Bundit.

He said a Regional Plan of Action to Promote Responsible Fishing Practices – including combating IUU fishing – had already been drafted by Southeast Asian countries. A workshop held in Bali, Indonesia from 4 to 6 March 2008 had made recommendations as follows:

- Formalize a MCS sub-regional network;
- Identify and assess key MCS gaps within the sub-region;
- Develop licensing and authorization processes for fishing and support vessels;
- Develop cooperative surveillance exercises;
- Develop sub-regional hot pursuit guidelines;
- Coordinate and integrate all relevant national agencies in MCS activities;
- Focus on mechanisms to improve the collection and analysis of information on fishing vessels, catches, trans-boundary market destinations of catches; and
- Strengthen institutional and human capacity building across the region.

Mr Bundit said that depletion of fish stocks, overfishing, conflicts between resource users, ignorance and violations of laws and regulations by fishermen were some of the main problems of coastal and marine fisheries in the region. In efforts to improve fisheries management by establishing MCS systems, some countries had succeeded, others had failed.

The failures might have been due to the 'common property' characteristic of fishery resources, lack of strict implementation of

MCS policies, shortage of manpower and equipment to enforce laws, and lack of coordination between government agencies concerned, said Mr Bundit.

Dr Md Giasuddin Khan, Senior Fisheries Specialist, WorldFish Center, Dhaka, discussed the "Status of Coastal and Marine Fishing Fleet in Bangladesh and Preparedness for a Monitoring, Control and Surveillance Regime". He said that a short study undertaken by The WorldFish Center at the request of the government confirmed that fish stocks are continuously declining.

Dr Khan said that over the last 20 years a big shift had occurred in the composition of catches of finfish trawlers. In 1984-1986, major commercial species caught were white grunters, croakers, catfish, breams, snappers and hair tails. Since 2005-2006 these have mostly been replaced by low valued species like acetes shrimp, crab juveniles and Bombay duck.

Surveys during 1984-1986 showed that 20 species had contributed to the main landings. In 2005-2006, this number had declined to 12. More valuable and longer-lived species were being replaced by smaller, short-lived pelagic fish species, said Dr Khan. Destructive fishing practices must be phased out and precautionary management approaches should be implemented wherever necessary.

On marine catch monitoring, Dr Khan called for development of local reporting systems, especially for artisanal fisheries. Mechanisms should be instituted to ensure proper selectivity in fishing gear and fishing operations, minimization of wastes and discards, reduction in catch of non-target species. Registration of all mechanized boats should be completed urgently. Given the limited capacity to mount sea-borne inspection, efforts should focus on land-based inspection.

Dr Khan said that the marine fisheries policy should be revised to reflect both the precautionary approach and the ecosystem approach (which recognizes that fisheries will impact the biological diversity of the wider ecosystem). Inter-sectoral conflicts should be minimized. Co-management and community-based fisheries management should be encouraged.

Commander Afazur Rahman Chowdhury of the Bangladesh Coast Guard (BCG) made a presentation on "Present status of legal support to implement MCS in the marine fisheries sector in Bangladesh".

He provided an overview of international laws such as the 1982 United Nations Convention on the Law of the Sea, the FAO Compliance Agreement and the 1995 UN Fish Stocks Agreement. He also discussed the 1995 FAO Code of Conduct for Responsible Fisheries (CCRF), which served as an instrument of reference to help States establish or improve the legal and institutional framework for responsible fisheries.

Mr Chowdhury said that many legislative instruments were already in force in Bangladesh to support MCS, directly or indirectly. These were ordinances, acts and rules administered by various ministries. The Marine Fisheries Ordinance, 1983, was the base law and regulatory instrument for marine fisheries in Bangladesh. It authorized the government to specify the types, classes and numbers of fishing vessels that could be deployed in Bangladesh waters.

Mr Chowdhury said that marine fisheries legislation had been generally implemented for industrial fishing trawlers. Implementation for the artisanal sector had been a challenge. The socio-economic conditions of fishers were a primary cause, but lack of responsibility, interference of pressure groups and lack of trained manpower in marine fisheries were other factors.

During Session II, the workshop divided itself into four groups to discuss four subjects.

Action Plan for Implementations of MCS in Bangladesh

A. Fish Stock Assessment

- Monitoring of catch and stock assessment should be carried out regularly. The provisions under the Bangladesh Marine Fisheries Capacity Building (BMFCB) Project should be utilized for the purpose. After completion of the BMFCB Project, the Department of Fisheries (DoF) should carry out this function with the involvement of the Local Stakeholder Committees (LSCs).
- Resource survey(s) should be organized, for which the Government may consider additional funding. Such survey(s) may take into account both maximum sustainable yield and maximum economic yield.
- Marine fish landings should be estimated on the basis of a statistically designed programme. To achieve satisfactory results, it needs to be ensured that fish catches are landed at designated fish landing points (Fishing Harbours or Fish Landing Centres).

B. Optimization of Fishing Fleet

- A thorough review of the mechanized and non-mechanized fishing fleet should be undertaken. Based on the present marine fish landings, available data on catch per unit effort and other biological parameters, the fishing fleet (both mechanized and non-mechanized and trawlers) should be adjusted and excess capacity phased out in a time-bound manner.
- The 31 numbers of 'under trial' fishing vessels operating at present must be banned. The 50 numbers of modern fishing

trawlers already licensed should commence fishing in the deep sea.

C. Registration and Licensing of Fishing boats

- All unregistered and unlicensed fishing boats should be registered/ licensed in a time-bound manner.
- The dual system of registration of fishing boats by the Mercantile Marine Department (MMD) and licensing by the DoF should be discontinued. There should be one-stop service point (single window) for registration and licensing under the control of DoF.
- The registration/ license fee structure should be reviewed.

D. Zonation of Fishing Grounds

- No fishing should be permitted in the coastal waters up to 5 meter depth/ 3 nautical mile (NM) distance. Non-mechanized fishing vessels may be allowed to fish beyond 5 meter depth and up to 40 meters. The zonation should take into consideration aspects such as the size of the fishing vessel, gear to be deployed and the engine horsepower.

E. Review of Fisheries Legislation

- A thorough review of the existing fisheries and supporting legislation should be undertaken and necessary amendments should be proposed keeping in view the requirements of Monitoring, Control and Surveillance (MCS).
- The review may also consider harmonization of the fisheries and supporting legislation with the global fisheries instruments and other documents aimed at sustainable development of the fisheries resources.
- To make the implementation effective, harmonization of the legislation may be considered.

F. Policy and Management Frameworks

- The exiting policies on fisheries development may be reviewed and, if necessary revised to meet the local requirements and also to confirm to the global instruments on sustainable fisheries development.
- The good practices adopted in the neighbouring countries may also be considered while reviewing the fisheries policies.
- A comprehensive marine fisheries management framework should be formulated for all commercially important fin and shellfish species. Implementation of the management framework already developed for species such as hilsa (*Tenualosa ilisha*) should be strictly enforced.

G. Institutional Strengthening and Human Resources Development

- Capacity building of officials of the DoF, MMD and other concerned organizations in both government and non-government sectors should be initiated in a planned manner. A GAP Analysis may be undertaken to arrive at the actual needs of capacity building and institutional strengthening.
- Strengthening of the fisheries institutions and other agencies concerned with the implementation of MCS (*e.g.* Coast Guard, Navy) should be taken up in a time-bound manner. This should also include strengthening of the organizational set up of the DoF at the coastal District and Upazila levels.
- The use of information technology should be stepped up in implementation of MCS. The Geographical Information System established in the DoF should be further strengthened.
- Skills and capacities of fisher groups and community-based organizations should be built through short-term and highly focused vocational trainings and hands-on workshops.
- Fisher communities in all the coastal districts should be mobilized to participate and assist in the MCS activities. The print and electronic media should be made use of to the fullest extent in creating awareness on MCS and its objectives.
- Cost-effective approaches such as 'co-management' of resources should be promoted to achieve the objectives. Stakeholder consultations should be initiated to decide on the modalities of co-management approach for MCS and related activities.
- Implementation of MCS should ensure that the livelihoods of small-scale fishers are safeguarded.
- The use of MCS should not be restricted to enforcement alone, but for providing multiple benefits to the fisher community such as promoting safety-at-sea, reducing post-harvest losses and promoting hygiene and sanitation in boat and at landing and berthing sites.

H. Coordination and Networking

- An inter-disciplinary high powered inter-ministerial committee should be constituted to coordinate the activities and also monitor the progress through performance indicators. Such a committee should be coordinated by the Ministry of Fisheries and Livestock.
- Formal and effective linkages should be established between the key players - DoF/ Navy/ Coast Guard/ MMD for implementation of the MCS programme.

Group I: *Registration and Licensing of Fishing Boats, Demarcation of Zones, Colour Coding, Communication and Surveillance Infrastructure:* This Group recommended that a one-stop service point be fixed for registration and licensing of fishing vessels; fishing zones for different categories of vessels should be demarcated; a no-fishing zone should be declared up to 5 meter/ 3 nautical mile; non-mechanized vessels should be allowed to fish in the 5 - 40 meter depth zone; the number of shore stations should be increased; the MMD should mount a vessel registration drive.

Group II: *Estimation of Fishing Capacity, Maximum Sustainable Yield and Optimization of Fishing Fleet:* This Group suggested that all categories of fishing vessels be reduced in number; the dual system for licensing/ registration of fishing boats should be stopped; the 'Zaman Committee Report' on trawlers should be implemented.

Group III: *Governance, Policy and Legislative Support to MCS:* This Group suggested that the Fisheries Policy document of Bangladesh should be revised in conformity with the CCRF; good practices from the experiences of neighboring countries should be incorporated in the policy; a high powered ministerial committee should be formed with DOF as lead agency to strengthen implementation of MCS and plug loopholes.

Group IV: *Institutions, Human Resource Development and Role of Non- Governmental and Community-Based Organizations:* This Group suggested better coordination between marine fisheries agencies; institutional strengthening; vocational and short-term training for fishers throughout the coastal belt; utilization of print and electronic media to create management and MCS awareness.

The Group presentations generated much discussion. There was unanimity on several of the points listed below:

- A cadre of enforcement officers should be created from the existing manpower.
- Strong coordination is needed among agencies such as MoFL, DoF, Navy and Coast Guard in implementing MCS.
- Registration of fishing vessels should be accorded top priority and modalities worked out by the DoF/ MoFL and the MMD. The registration procedure should be transparent.
- The fishing fleet must be restricted to optimum size and zones should be set up for different categories of fishing boats to help reduce conflicts and promote sustainability.
- A manual on MCS should be prepared. It will set out procedures for implementing agencies and their work, funds needed, time-frame, etc.
- Should trawlers fish only in depths beyond 40m? Should zoning decisions be made on the basis of depth of the waters or distance from the shore? The questions should be discussed.
- The Bangladesh Navy and Coast Guard must be strengthened both to implement MCS and assist fishers at sea.
- Log books should be mandatory for fishing boats.
- Pollution from land-based sources is increasing and should be checked.
- Landing centres should be maintained and managed better, and all fishing vessels must land at these centres. New landing centres should be established.
- A one-stop service should be provided for registration of fishing vessels; MMD should be given this responsibility.
- Mesh size regulations should allow fish at least one opportunity to breed and propagate.
- No fishing should be permitted in breeding grounds such as mangroves.
- Catch-based surveys should be initiated prior to stock assessment.
- The services of the Bangladesh Space Research and Remote Sensing Organization should be used to identify potential fishing zones.
- Colour coding should be carried out for different categories of fishing vessels.
- New surveillance check posts should be set up along the coastline (at places such as Borguna, Satkhira, Patherghata, Bagerhat, etc.)
- Fisher community participation in MCS should be encouraged to foster the feeling of community ownership of resources, also to make MCS cost-effective.

On the basis of the recommendations made by the workshop, a draft Action Plan on Implementation of MCS in Bangladesh was presented by Dr Yadava. It was discussed and a final Action Plan adopted by the workshop (see page 10-11). Dr Yadava described the Action Plan as comprehensive. Its implementation would help sustainable development of marine fisheries resources in Bangladesh.

In the workshop's concluding session, Mr Rafiqul Islam, chairperson, said that the Action Plan would have to be implemented in a phased manner. A group would be constituted to prioritize actions and identify the modalities for implementation.

Mr Nasiruddin Md Humayun proposed a vote of thanks. He said the Royal Embassy of Denmark would be willing to support development of sound policies on MCS through the SICD Project.

Workshop in Chittagong Makes Recommendations for Sea Safety of Fishers in Bangladesh

Forty-nine persons took part in a workshop on "Safety at Sea for Small-scale Fisheries," held in Chittagong, Bangladesh, on 21 and 22 January, 2008. It was organized by the BOBP-IGO in co-operation with the Food and Agriculture Organization (FAO) of the United Nations and the Ministry of Fisheries and Livestock (MoFL), Bangladesh.

The participants represented the MoFL; the Department of Fisheries (DoF); the Bangladesh University of Engineering and Technology; the Navy and Coast Guard; the Bangladesh Fisheries Research Institute; the Mercantile Marine Department; the Bangladesh Maritime Training Institute; the Bangladesh Fisheries Development Corporation; the Fisher Association and Cooperative Societies; the Boatbuilders Association; representatives of boatyards; experts; the FAO and the BOBP-IGO.

Mr Syed Ataur Rahman, Secretary, MoFL, presided over the inaugural session. Mr Parikshit Datta Choudhury, Joint Secretary (Fisheries), MoFL, chaired the remainder of the workshop.

Welcoming participants, Dr Y S Yadava, Director, BOBP-IGO, pointed out that while safety at sea is a problem with small-scale fishers everywhere, it is even more serious in Bangladesh because it is a frequent victim of natural calamities. He said the global programme on Safety at Sea and its South Asian component would catalyse efforts to improve the safety and well-being of small-scale fishers in the region.

Mr Md Mokammel Hossain, Director-General, DoF, said that after the devastation caused by cyclone SIDR, discussions have taken place on extending programmes on safety at sea to small-scale fishers. At present, little knowledge exists about fish stocks in the Exclusive Economic Zone (EEZ) of Bangladesh. This aspect needed strengthening, besides development of Monitoring, Control and Surveillance (MCS) in marine fisheries.

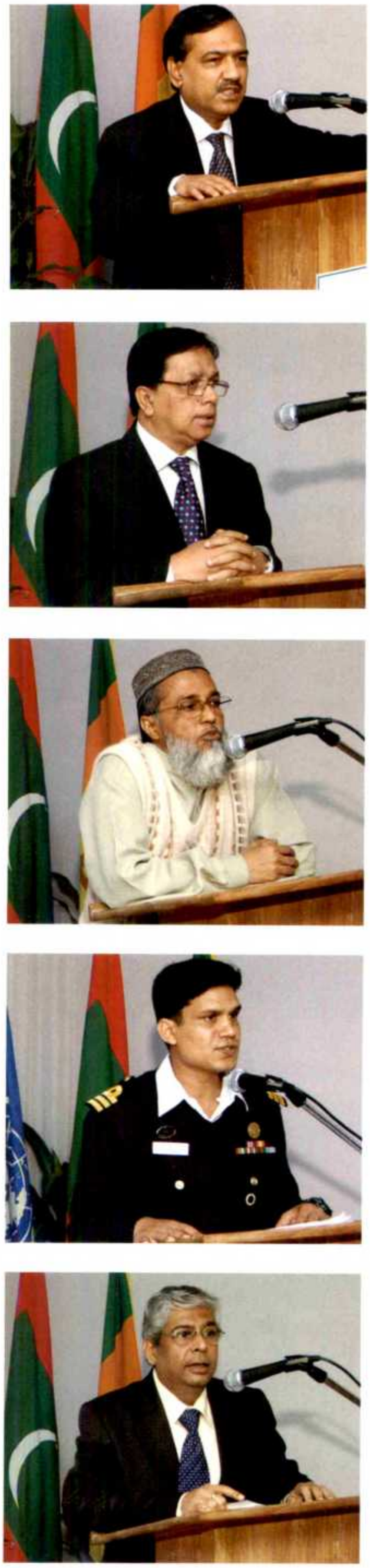
Mr Parikshit Datta Choudhury, Joint Secretary, MoFL, described the safety of small-scale fishers as an area of neglect. Cyclone SIDR had lent urgency to the subject, and the government has initiated some measures. The Safety at Sea Project is a bold step in the right direction.

Mr R Ravikumar, FAO Regional Programme Coordinator, Safety at Sea Project, gave a brief outline of the Project and its proposed activities.

In his inaugural address, Mr Syed Ataur Rahman, Secretary, MoFL, said that over time, a rapid increase has occurred in the fisher population of Bangladesh and in fishing effort. Result: fisher incomes have been falling. Fishers are trying to mechanize their boats and venture into deeper waters for higher catches, but weather conditions in the Bay of Bengal threaten their effort. Lives have been lost, boats have been damaged, fishers have suffered grave misery.

National Workshop on
Safety at Sea for Small-scale Fisheries
Chittagong, Bangladesh, 21-22 January 2008

Participants at the Sea Safety Workshop.



Top to bottom: Mr Syed Ataur Rahman, Mr Parikshit Datta Choudhury, Mr Md Mokammel Hossain, Cdr Mir Ershad Ali, Mr R Ravikumar.

Mr Rahman said fishers fend for themselves, depending on traditional knowledge and experience. They have no communication equipment or life-saving appliances. Cyclone SIDR had killed more than 3 000 people, mostly fishers. "If we had informed fishers about SIDR, many lives would have been saved."

The UNDP/ FAO/ BGD Project on "Empowerment of Coastal Fishing Communities for Livelihood Security (ECFC Project)" had provided some help, Mr Rahman said. But much more is needed to be done, including welfare measures for fishers. A national focal point had to be identified for the Safety at Sea Project, and costs integrated into the revenue budget. "We should take lessons from this workshop and frame guidelines on what is to be done."

Technical Sessions

During the first Technical Session of the workshop, five presentations were made. Mr Ravikumar said the South Asian component of the SIDA- funded and FAO-executed Global Project on "Safety at Sea for Small-scale Fisheries" is being implemented in Bangladesh, India, Maldives and Sri Lanka. The Project is expected to come up with (i) guidelines and rules for design and construction of boats and good boatyard practices, (ii) stakeholder training/ awareness programmes, (3) safety at sea -fishery management integration, and (4) improved reporting and analysis of mortalities/ injuries at sea.

The second presentation was made by Mr A F M Sirajul Islam, engineer and ship surveyor, MMD, on "Overview of safety aspects of small fishing craft in the marine sector of Bangladesh". Mr Islam said that Bangladesh has some 2.5 million small-scale fishers and 35 to 40 000 fishing boats. Wood is the basic material for boat construction. Design is based on traditional knowledge.

Mr Islam said that during the monsoon, cyclonic weather caused by depression creates problems for fishers, leading to boat capsize and loss of life and property. Engine failures are also very common, and boats drift. There are no rules and regulations for the safety of small-scale fisheries or for the construction, stability and maintenance of small boats.

Mr Islam said that building community awareness programmes, and measures such as registration of fishing boats, insurance schemes for fishers and their assets, and implementation of IMO and ILO norms and guidelines, were necessary.

Commander Mir Ershad Ali of the Bangladesh Navy made the next presentation on "Overview of search and rescue operations in Bangladesh". He said that Bangladesh has acceded to some 20 IMO conventions. It has Marine Search and Rescue (SAR) Centres located in Chittagong and Khulna. Numerous accidents occur in the Bay of Bengal due to poor seamanship, the age of fishing vessels and human error.

Commander Ali said that the Marine Fisheries Ordinance, 1983, mandates the Bangladesh Navy with surveillance duties. The four main players on surveillance are the Navy, the Air Force, the Coast Guard and the Department of Shipping. Funds are short, a national-level SAR organisation doesn't exist: these are the two main constraints to SAR operations in Bangladesh.

In the next presentation, Dr Abdur Rahim, Professor, Bangladesh University of Science and Technology, highlighted "Training needs in safety at sea for the maritime fishery sector". Dr Rahim classified fishing vessels of Bangladesh into (i) Deep sea trawlers, (ii) Wooden offshore boats, and (iii) Small inshore and estuarine boats.

He said that deep sea trawlers have been imported from South east Asia. Offshore wooden boats operate in a hazardous environment. Those made from locally available wood last 4 to 5 years, while boats of imported wood last more than 10 years. There is no dearth of skilled craftsmen in Chittagong and Cox's Bazaar, Dr Rahim said. The problems are lack of public finance as well as lack of training in boat design.

The session's final paper was presented by Mr Sk Mostafizur Rahman, Project Director, RFLDP Barisal component. He shared with the workshop the experience of the ECFC project in Cox's Bazaar district during 2000-2006.

Mr Rahman said the Project was implemented in all the eight upazilas of Cox's Bazaar District, covering 117 villages. The project targeted the poor and the disadvantaged, assisted communities in empowerment, introduced economic and community welfare activities, ran a community radio programme, facilitated conservation and management of natural resources through community-based approaches.

Mr Rahman said that the project decentralized implementation of activities. Fishers, especially women, took active part. Lack of safety equipment, inadequate access to weather information, inappropriate design and construction of small fishing boats, absence of a strong data base on accidents at sea, inadequate SAR operations – these were the major drawbacks concerning sea safety for small-scale fishers.

The workshop's second technical session consisted of group discussions. Participants were divided into three groups. They discussed knowledge gaps in fisher communities on safety awareness; knowledge gaps in national agencies on safety at sea initiatives; and knowledge gaps in the service industry on safety aspects for the fisheries sector.

Each group presented its ideas and findings to the workshop. These were discussed, and recommendations followed.

Recommendations

The workshop agreed that existing rules and regulations (*e.g.* SOLAS 1974; Marine Fisheries Ordnance, 1983) do have adequate provisions to ensure the safety of fishers at sea, but their application at the field level must be improved. Fishing vessel inspectors and surveyors must be trained to interpret rules and regulations concerning safety. An implementable National SAR plan should be formulated, which identifies the roles, responsibilities and capacities of different players responsible for SAR.

The workshop recommended that boat owners be persuaded to provide adequate communication and navigation equipment to the crew. Awareness programmes should be undertaken on proper use of fishing gear, safety and communication equipment, the use of distress signals, etc. Communication equipment like VHF must be demonstrated and then introduced. The community should be systematic in reporting accidents at sea and in implementing safety guidelines among fishers. NGOs and CBOs can play a vital role in this effort.

The workshop agreed that skills of boatbuilders and other service providers should be augmented through training. Traditional wooden boats are inadequate for modern fishing practices. Skill variations among different boatbuilding centers must be looked at.

Participants agreed on the need to diversify boatbuilding materials: FRP is now a common boatbuilding material in South Asian countries. They also agreed on registration of boatyards to ensure quality.

The workshop emphasized the need for a proper surveillance and reporting system for accidents and incidents at sea. Fishing effort should be aligned with scientifically assessed fish stocks for proper fisheries management.
A 'precautionary approach' should be adopted toward fishing effort till reliable data on stocks was available.

The workshop emphasized the need for a database on the fishing fleet and a proper boat registration mechanism. This would help check piracy, which is rampant in Bangladesh waters. It also stressed the need for insurance of life and property of fishers as a necessary condition for sea safety. At present, such insurance does not exist.

The workshop recommended a national fisheries management plan drawing on the strengths and needs of all the players. Safety at sea would be a necessary ingredient of such a plan, besides resource management, effort control and modernization.

The workshop agreed on pilot-scale implementation of activities in the Cox's Bazar area on the basis of recommendations made by the three groups. The activities included (i) awareness-building at the community level, (ii) promotion of an MCS regime through database building and simplification of registration procedures, and (iii) development of technical guidelines and information materials on sea safety including boatbuilding, life-saving appliances, distress and weather signals, etc.

Mr Parikshit Datta Choudhury expressed his satisfaction over the outcome of the workshop. He hoped its recommendations would be taken up for implementation by the BOBP-IGO and other agencies, and assured full government support for the project's implementation.
Dr Y S Yadava proposed a vote of thanks.

India, Bangladesh and Myanmar Lay out Road Map for a Management Plan for Hilsa Fisheries

Participants at the Regional Consultation.

Delegates from Bangladesh, India and Myanmar have laid out a road map for a management plan for hilsa fisheries. This was done at a regional consultation organized by the BOBP-IGO on March 14-15, 2008, at the Central Inland Fisheries Research Institute (CIFRI), Barrackpore (Kolkata).

Welcoming delegates, Dr Y S Yadava, Director of the BOBP-IGO, recalled that management plans for two important commercial fisheries – hilsa and sharks – were first mooted at the Second Meeting of the Technical Advisory Committee of the BOBP-IGO in Chennai in February 2007. It was suggested that the management plan for hilsa fisheries should be prepared by Bangladesh, India and Myanmar and the management plan for shark fisheries by India, Maldives and Sri Lanka. Although Myanmar is not a member of the BOBP-IGO, its inclusion was considered essential since hilsa forms an important commercial species in the Irrawady River System.

At the Barrackpore consultation, the opening session was followed by a technical session (with papers from the three countries on the status of hilsa). On the basis of guidelines put up by the BOBP-IGO secretariat, the delegates prepared information logframes and laid out a road map as follows for a management plan:

- A comprehensive status paper would be prepared on hilsa fisheries resources, including a bibliography on research work. Action: R&D institutions and universities in the region. (The status paper would discuss resources, production, MSY, stock assessment, impacts, legal and policy support, projects & programmes, etc.)
- A stakeholder consultation on hilsa management would be organized in each of the three countries. Alternative livelihoods for hilsa fishers would be an important part of the consultation.
- A data collection, collation and compilation mechanism would be set up in member-countries; a National Task Force would be established in India and Myanmar; a 'Hilsa portal or website' would be created for the Bay of Bengal region.
- Awareness materials on conservation and sustainable exploitation of hilsa fisheries would be prepared.

Key Institutions	Supporting Institutions
Bangladesh	
Bangladesh Fisheries Research Institute, Mymensingh	• Ministry of Fisheries & Livestock • Department of Fisheries
India	
Central Inland Fisheries Research Institute, Barrackpore	• Ministry of Agriculture (Department of Animal Husbandry, Dairying and Fisheries) • Fishery Survey of India, Mumbai • Central Marine Fisheries Research Institute, Kochi
Myanmar	
Fisheries Resource Conservation Unit, Yangon	• Ministry of Livestock & Fisheries • Department of Fisheries

- A Gantt chart (on page 18) covering the period April - September, 2008 was prepared to carry out these activities in a systematic time-frame.

During the opening session, Dr Yadava said the hilsa fishery – which is a source of food, nutrition and livelihoods in the coastal, estuarine and inland areas of the three countries – is at present subject to severe stress from natural and anthropogenic impacts. Both qualitative and quantitative changes have occurred in the landings of this species in recent years. A management plan is therefore urgent to check further impacts on the fishery.

Dr Musharaf Ali, Assistant Commissioner (Fisheries), Government of India, expressed concern over the declining stocks of hilsa due to human intervention, and called for all-out management effort.

Dr K K Vass, Director of CIFRI and chairperson of the Consultation, congratulated the BOBP-IGO on its initiative of a Regional Consultation. He said a management plan for hilsa fisheries should look beyond commercial aspects and take into account sustainability and livelihood issues.

Technical Session

Dr Khan Kamal Uddin Ahmed, Principal Scientific Officer of the Bangladesh Fisheries Research Institute, Mymensing, Bangladesh, made a presentation on the "Status of Hilsa Fishery in Bangladesh". He described hilsa as the "national fish of Bangladesh", and said it accounts for 50-60 percent of the global hilsa catch, 12 to 13 percent of national fish production and about 1 percent of the country's GDP.

Dr Ahmed said the annual average of hilsa landings during the period 1983-84 to 2006-07, was 2 10 498 tonnes. During the last two decades, hilsa production from inland waters declined about 12 percent, while production from the marine sector increased two-fold. The number of marine fishing boats and gear has increased about four times since 1984-85, resulting in tremendous fishing pressure on hilsa fisheries in marine waters.

Explaining the results of a scientific study, Dr Ahmed said that the hilsa of Bangladesh, India and Myanmar belong to the same stock. Most hilsa born in fresh waters live and grow in the sea and migrate upstream for breeding and feeding. The adults again return to the sea after spawning.

Some 4 60 000 fishers from 1 83 000 families are active in hilsa fisheries in Bangladesh. About 88 percent of the fishers have no land or less than 0.5 acre of land. Some 1 00 000 crafts engage in hilsa capture in inland waters, while mechanized and non-mechanized boats and gear in the marine sector number around 106 000. Commercial hilsa fishing occurs in the marine and riverine areas throughout the year and peaks during September and October.

The Regional Consultation in progress.

A majority of hilsa catch (60-70%) occurs during the peak breeding season.

Dr Ahmed referred to three important management measures undertaken recently by the Bangladesh Department of Fisheries. These are the special operation to protect and conserve juvenile hilsa, the *jatka*; declaration of hilsa sanctuaries in major nursery grounds; and conservation of gravid hilsa in the major spawning grounds for uninterrupted spawning. Since hilsa is a common resource of the Bay of Bengal, with Bangladesh, India and Myanmar together harvesting 90-95 percent of the resource, a tri-country initiative for hilsa management and conservation is urgently required for sustainability.

Dr K K Vass presented a country paper on "Status of Hilsa Fishery in India". He said hilsa occurs on the east coast of India (river Ganga and its tributaries, the Chilika brackishwater lake), the rivers Brahmaputra and Barak in Assam and rivers of the west coast.

Dr Vass said that increased market demand for hilsa and the high price it commands have increased the fishing pressure on the species during the past three to four decades. The trend is continuing. Driven by the urge for higher harvests, fishers are deploying more and more effort, paying little attention to size or season. Such indiscriminate exploitation has resulted in a remarkable decline in mean length and weight of catch, especially in larger river systems.

Dr Vass suggested regulations on mesh size (for example, an increase in mesh size from the existing 8-12 cm to 9-13.5 cm) and optimum fishing effort on hilsa. Besides increasing the mean weight and overall production, this would also allow fishes to spawn at least once before being caught.

Dr Vass recommended that a better understanding be obtained of the population dynamics and MSY of

Gantt Chart for proposed activities to support preparation of a management plan for Hilsa.

Sl. No	Management aspects	2008					
		April	May	June	July	August	September
1.0	Preparation of comprehensive status paper on hilsa	←	—	→			
2.0	Stakeholder consultation		←	—	→		
3.0	Setting up the data collection mechanism	←	→				
4.0	Setting up of National Task Force	←	→				
5.0	Setting up of a 'Hilsa Portal/ Website'				←	—	→
6.0	Preparation of awareness materials				←	—	→

hilsa species through stock assessment conducted by countries sharing the resource. He also suggested a bibliography on hilsa; development of effective harvest and post-harvest technologies; and investigations on the feasibility of raising of hilsa in the lacustrine environment.

Mr U Aung Htay Oo, Senior Fisheries Officer (Research), Department of Fisheries, Government of Myanmar, said that in his country, small-scale fisheries generally comprise two categories of fishermen – the fishing boat owner and the crew. Most fishing boat owners do not go out to the sea; but in the inland sector, many of the boat owners are active in fishing.

Discussing the state of information on hilsa, Mr Oo said that no specific research activities are being carried out at present on hilsa fisheries. Technical assistance from regional organizations like the BOBP-IGO and from developed countries would be useful for a hilsa management plan. As precautionary measures, Mr Oo suggested mesh size control and protection of juvenile hilsa. Awareness-creation among fishers for conservation and sustainable exploitation of the hilsa fishery would be essential.

Preparing a road map for the management plan

After the three country status reports on hilsa, Dr Y S Yadava discussed three peculiar characteristics of hilsa. Its stocks are shared among three coastal states; it is migratory in character; it is predominantly an artisanal fishery distributed far and wide in the coastal areas. These factors render a sound monitoring and control mechanism in a given fishing area difficult, particularly when harmonized management practices are absent.

He said the BOBP-IGO had drawn up guidelines on working toward a hilsa management plan from the 1995 FAO Code of Conduct for Responsible Fisheries (CCRF). The Guidelines include a "Framework for a Management Plan on Hilsa," which has four main heads relating to information, institutional arrangements, stakeholders, and finance and funding.

On the basis of this framework, an indicative discussion map with six log-tables was prepared and given to the participants. The log tables were headed as follows:

Log 1: Status of Hilsa fishery in the Bay of Bengal.

Log 2: Natural and anthropogenic impacts.

Log 3: Socio-economic analysis – institutional arrangements.

Log 4: Socio-economic analysis – awareness creation and training.

Log 5: Socio-economic analysis – livelihood and trade.

Log 6: Economic analysis – funding requirements and provisions.

Representatives of each country together analyzed the situation of hilsa fisheries in their respective countries in terms of information sought in the log tables for a management plan. Gaps in information, and the future course of action, were identified. The resulting log tables were presented to the Consultation.

The Consultation constituted a technical committee in each country – key institution and supporting institutions – to initiate action on the management plan. It was also agreed that the next Regional Consultation on the subject will be held in Bangladesh during the last quarter of 2008, subject to the approval of the Government of Bangladesh.

BOBP-IGO holds Third Technical Advisory Committee Meeting in Sri Lanka

The Third Technical Advisory Committee of the BOBP-IGO discussed and approved the Organisation's workplan for the period April 2008-March 2009 at a meeting in Beruwala, Sri Lanka, on March 28-29, 2008. Senior fishery representatives from the four member-countries and an observer from the FAO took part. Mr Neomal Perera, Deputy Minister of Fisheries & Aquatic Resources, Sri Lanka, was the chief guest at the inaugural session.

Dr Yugraj Singh Yadava, Director of BOBP-IGO, welcomed the chief guest and the delegates. He said that the TAC plays the important role in the BOBP-IGO of identifying key issues for intervention. He urged member-countries to thoroughly review past work and set future directions.

Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources (MoFAR), Sri Lanka, said that member-countries had the will and capacity to work closely with the BOBP-IGO. He hoped the meeting would yield important outputs for sustainable development and management of fisheries in the Bay of Bengal region.

In his inaugural address, Minister Neomal Perera described the BOBP-IGO as a unique regional fisheries body to help governments improve the quality of life of small-scale fishers in the region and strengthen their livelihood opportunities. He recalled with appreciation the three-day Regional Consultation in Sri Lanka on "Preparation of Management Plans for Shark Fisheries". He hoped the fruitful partnership between Sri Lanka and the BOBP-IGO would continue. Mr Indra Ranasinghe, Director General (Fisheries Development), MoFAR, proposed a vote of thanks.

Mr P Sivaraj (India), acting chairperson, said the BOBP-IGO was doing a commendable job in promoting the sustainability of marine fisheries in the region. He appreciated the Organisation's efforts in 2007-08. Sri Lanka was unanimously chosen to chair the third meeting of the TAC.

Report on BOBP-IGO activities

Dr Yadava presented the BOBP-IGO's report for April 2007-March 2008, and detailed the status of various activities undertaken as per the agreed work programme.

Safety at Sea: The South Asia Component of the Global Project on "Safety at Sea for Small-scale Fisheries (GCP/GLO/200/MUL)" implemented by the FAO (Fisheries Industries Division) through the BOBP-IGO was initiated in May 2007.

The project seeks to analyse data to identify the causes of accidents; educate and train trainers, extensionists, fishermen and inspectors; strive for better fisheries management measures and safety regulations; develop improved communication systems; and apply FAO draft guidelines for construction and repair of small FRP fishing vessels.

The Alaska Center of the National Institute of Occupational Safety and Health (NIOSH) of the Centers for Disease Control (CDC), USA, also assists the project. It funds a component on surveillance and monitoring of fishing-related accidents at sea.

During the year, National Workshops were organized in Negombo, Sri Lanka (11-12 October 2007); Chennai, India (3-4 December 2007); and Chittagong, Bangladesh (21-22 January 2008). Government officials, fishers, boatbuilders, other service providers and NGOs took part. At these workshops, gaps in information, service and policy on sea safety issues were identified. National action plans for pilot- scale implementation were designed.

The joint FAO-IMO Project on "Tsunami Reconstruction and

Third Meeting of the
Technical Advisory Committee
28 - 29 March 2008
Beruwala, Sri Lanka

Participants at the Technical Advisory Committee Meeting.

Rehabilitation in Sri Lanka and India on Small Fishing Vessel Safety" was also initiated during the period. This project assesses the standards of boats built and distributed to fishers as part of tsunami relief. It introduces construction and equipment standards for small fishing vessels, on the basis of the FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels.

Mr Oyvind Gulbrandsen, FAO/BOBP-IGO Consultant, did a detailed assessment in November-December 2007 of the quality of construction and design of small-scale fishing vessels in India and Sri Lanka. He would provide guidelines for the construction of FRP fishing vessels and wooden fishing vessels (below 24 meter in length), commonly used in India and Sri Lanka, and also guidelines for FRP boatyards in the region.

The FAO Fishery Officer (Mr Roger Kullberg) attached to the Safety at Sea Project made field visits to Patuakhali, Kuakata and Barisal in Bangladesh from 23 to 29 January 2008. He studied and assessed the quality of fishing boats – their construction, availability of communication and safety equipment, and safety preparedness of the crew, etc.

The Regional Workshop on "Monitoring, Control and Surveillance (RW-MCS) for marine fisheries in the Bay of Bengal" was held in Chittagong, Bangladesh, on 16-18 January 2008. Twenty-three representatives from ministries and departments of fisheries; the Coast Guard and the Navy; the Mercantile Marine Department; fisheries research institutions; boatbuilders and fish exporters of the region; experts plus the FAO took part. The Chittagong Resolution (see page 42) was a significant outcome of the workshop.

Resource Management: Two Regional Consultations were organised – to discuss management plans for hilsa fisheries, covering Bangladesh and India (and Myanmar as observer country); and a management plan for shark fisheries covering India, Maldives and Sri Lanka.

The Hilsa consultation was organised in Barrackpore (Kolkata), India, on 14-15 March, 2008. Eleven delegates took part. After reports and discussion on the current status of hilsa fisheries resources, the Consultation recommended an action plan to initiate a management plan. A detailed report on the 'Hilsa Consultation' is available on pp 16-18.

Likewise, a regional consultation on shark fisheries (held in Beruwala, Sri Lanka, 24-26 March, 2008) agreed on an action plan. The detailed report on the 'Shark Consultation' can be seen on pp 47-50.

Miscellaneous: The BOBP-IGO's attractive 2008 desk calendar focused on sea-safety measures. A single-sheet wall calendar and a set of six laminated placards on distress signals and checklists were prepared as awareness material for fishers.

The BOBP-IGO has published a newsletter and 12 posters in English on the Code of Conduct for Responsible Fisheries (CCRF), and initiated a process to translate them into Bangla, Dhivehi, Oriya, Sinhalese, Telugu and Tamil. Archiving is being done of over 50 000 photographs relating to three decades of the programme.

Supportive activities: The BOBP-IGO collaborated with UNDP and the Government of Orissa in preparing a report on "Development of Marine Fisheries and Post-harvest Sectors in Orissa". It helped implement a training project on "Promotion of Community-based Fishery Resource Management by Coastal Small-scale Fishers in Thailand". It took part in an expert consultation on "Low Cost Fisheries Management Strategies and Cost Recovery," held in Georgetown, Guyana, 4-7 September 2007; and in a technical consultation in Rome (4-8 February, 2008) to formulate international guidelines for the management of deep-sea fisheries in the high seas.

Mr Neomal Perera, Deputy Minister for Fisheries & Aquatic Resources, Government of Sri Lanka.

Discussion on BOBP-IGO activities

Catch statistics: Mr Simon Funge-Smith (FAO) said that while the quantity of fish catch has gone up in the region, the landings show a disturbing trend since we are fishing down the food chain. The BOBP-IGO should inform national governments and the FAO about this trend.

Mr Sk Mostafizur Rahman (Bangladesh): A management plan for protection of shark fisheries is needed in Bangladesh too, because in recent years large quantities of shark juveniles are being caught in Bangladesh waters. Bangladesh should therefore be included in the BOBP-IGO's management plans for shark. (The TAC asked the Secretariat to raise the issue at the next Governing Council meeting.)

Utilization of tuna: Dr Champa Amarasiri (Sri Lanka) said that coastal fishing effort in Sri Lanka can't be increased further. Offshore waters offer some scope; even here, reports of over-exploitation of yellowfin tuna suggest the need for caution.
Mr Sivaraj said that India's offshore waters are yet to be exploited for tuna and tuna like species.
Dr Shiham Adam (Maldives) said that Indian Ocean skipjack stocks are resilient, and are not being over-exploited.

Mr Funge-Smith said the FAO is considering a Regional Technical Cooperation Programme (TCP) on improved utilization of tuna, to be implemented through INFOFISH, Kuala Lumpur. Some BOBP-IGO member-countries might also be included in the Regional TCP. He suggested that member-countries could consult the Indian Ocean Tuna Commission (IOTC), and raise issues with the IOTC Working Party on Tropical Tunas, which would be held later this year. Dr Amarasiri said that member-countries ought to prepare their own plans before approaching the IOTC.

Delegates suggested a BOBP-IGO strategy consultation on tuna fisheries, which would include representatives of industry as well. The Director of BOBP-IGO should attend the next meeting of IOTC, it was felt.

Mr Rahman suggested joint stock assessments by member-countries. The Indian delegate said the Fisheries Survey of India (FSI) could carry out regional surveys of stocks. BOBP-IGO said it could support the participation cost of one technical person from each member-country in the fishing vessels of FSI, after agreements among member-countries. The delegate from Sri Lanka pointed out that accessing data from joint surveys was at times difficult. This negated the objectives of such surveys.

The TAC advised the Secretariat to encourage multilateral agreements among member-governments. If possible, key institutions should be identified for easy and timely dissemination of data among the stakeholders.

Proposals and priorities from member-countries

Bangladesh: Mr Rahman identified areas in marine fisheries where BOBP-IGO could play a major role in tapping the potential of his country's marine waters – such as information networking among member-countries on fish stocks and creation of a fish data base; management plans on important fish species; an effective regional MCS system; regional cooperation in weather forecasting; and networking of community-based organisations in fisheries.

He said member-countries should harmonize management practices for shared stocks – including ban on destructive fishing practices and declaration of closed seasons for fishing.

India: Mr P Sivaraj said the activities of the BOBP-IGO were in line with India's priorities. Activities such as safety at sea and MCS have been included in India's 11th Five-Year Plan. The BOBP-IGO is playing an important role in creating awareness among fishers and promoting sustainable fisheries in India. It should step up efforts to disseminate the CCRF so that it reaches a critical mass of stakeholders. Mr Sivaraj suggested that the BOBP-IGO should help transfer useful technologies from one member-country to another, especially in small and medium-sized boat construction.

Maldives: Dr Shiham Adam said that while tuna continued to be the mainstay of fisheries in the Maldives, coastal fisheries (especially reef fisheries) are an important source of income and livelihoods for communities in the outer atolls of the Maldives. The rapid expansion of tourism has increased the demand for reef fishes.

Dr Adam said that reef sharks in the Maldives are being severely depleted and gulper sharks are being over-exploited. The other fisheries that need attention include aquarium fishes, sea cucumbers and lobsters. At present, Maldivian ornamental fishes have limited direct access to foreign markets; they are mostly exported to Sri Lanka and re-exported from there to markets abroad. One of the priorities for Maldives is to develop mariculture so as to reduce the effort on wild stocks. The Government has announced 11 potential sites to be leased out on a long-term basis for aquaculture.

Sri Lanka: Dr Amarasiri said that Sri Lanka's priority is to develop the coastal tuna longline fishery. The skills and capacities of small-scale tuna longliners must be upgraded, fish handling and processing must be improved both on-board and after landing. To ensure a continuous supply of low-cost good-quality bait, Sri Lanka plans to initiate milk fish farming and to introduce bait fishery in coastal areas. The country needs a tuna fishery management plan and a fleet development plan to exploit tuna resources in a sustainable manner, Dr Amarasiri said.

Discussion on country proposals

Initiating discussions on the country proposals and priorities, Dr Adam said that development of milk fish hatcheries for bait fishing is important to the Maldives. Listing some collaboration options, Dr Yadava said that at present India imports milk fish from the Philippines. The Network of Aquaculture Centres in Asia-Pacific (NACA), Bangkok, could be approached to develop milk fish farming in the region.

Dr Funge-Smith endorsed the proposal of the Secretariat for associating NACA with milk fish farming. He said that the Philippines has good technology in milk fish farming and is now moving towards a cage-based milk fish culture. He, however, cautioned that issues related to disease transfer should be carefully considered. He also said that NACA had already developed technology for grouper fisheries.

Referring to the MCS priorities of Bangladesh, Dr Yadava said that countries may like to first develop their national MCS action plans through stakeholder consultations. He said the Secretariat is networking with FAO and other international agencies to explore the scope for external assistance and funding. Mr Funge-Smith suggested that the BOBP-IGO discuss possible

The Technical Advisory Committee in progress.

collaborations with the FISHCODE programme and the IUU Monitoring Network of DFID. He also suggested that information networking should be strengthened.

Presentation on Regional Programmes/ Activities/ Issues of topical importance

The Secretariat proposed four new activities during 2008-2009.

a) **Preparatory studies on alternative livelihoods for fishers**: A few comprehensive socio-economic studies could be taken up. Eventual aims: to encourage fishers to think beyond fishing and reduce fishing effort, and reduce the vulnerability of fishers to various shocks.

Mr Ranasinghe said that mariculture, aquaculture, construction work and dress-making had been tried out on a pilot basis as alternative livelihoods for fishers in Sri Lanka during the last four years. Of these, aquaculture (sea bass farming in the Negombo lagoon) was the most successful.
Mr Ranasinghe said that good technical guidance is a pre-requisite for any alternative livelihood activity.

The FAO Representative said that Spain is supporting FAO in implementing the Asia-Pacific Rural and Agricultural Credit Association (APRACA) programme in which Sri Lanka is proposed to be included.

b) **Study on impact of fuel price hike on marine fisheries:** This will address the problem of small-scale fishers and develop a coping strategy for them.

Dr Adam said that Maldives had proposed a subsidy scheme for fishers to offset the effect of price hike. He suggested that the study may look into fuel efficiency. The Bangladesh delegate said that a fuel subsidy for fishing boats was introduced 10 years ago in his country. Mr Ravikumar, FAO Regional Sea Safety Coordinator, said that fishers tend to increase engine power without any genuine need to do so. It is more of a rat race and needs to be curbed. The chairperson said that the Cey-Nor Foundation in Sri Lanka, which looks into marketing aspects, offers fishers guaranteed prices. The scheme has been working well for the last seven years; presently, 19 varieties of fish species are covered under this scheme. Mr Funge-Smith said that subsidies can keep the prices of fish artificially low, resulting in their over-exploitation.

c) **Study of the impact of climate change on fisheries**: This will record and monitor research efforts in member-countries in tracking the impact of climate change, particularly on coastal fisheries. Information will be disseminated.

d) **Study on capacity-building in food safety in marine fisheries:** The aim is to improve handling of fish on board and at fishing harbours or fish landing sites, and raise awareness among stakeholders about measures necessary to strengthen safety and improve hygiene.

The delegate from Sri Lanka said that waste disposal at the Beruwala Fishing Harbour has been very successful; this could be a model for other harbours in the region.
Mr Funge-Smith suggested that the Secretariat look at the FAO-TCP Project on 'Cleaner Fishing Harbours' implemented in India.

Secretariat: Work Plan

Presenting the BOBP-IGO's work plan for the period April 2008-March 2009, Dr Yadava said the IGO would continue with its capacity-building and resource management activities. It would carry out two scoping studies on management of small-scale tuna fisheries and management of brood stock of tiger shrimp, besides the four proposed new activities.

The TAC endorsed the work plan and asked the Secretariat to present it at the next meeting of the Governing Council.

Secretariat: Review of Role of TAC

The Secretariat requested the TAC to evaluate its own role, as recommended by the BOBP/IGO's Governing Council. The representative of FAO suggested that TAC should develop the Organisation's work plan, make policy recommendations to the Governing Council and identify emerging issues in fisheries.

Some members felt that a review of the role of TAC was premature since the BOBP-IGO is only about five years old. Such reviews can be conducted after 10 to 15 years.

The TAC adopted the report of the meeting, recorded its deep appreciation to the Government of Sri Lanka for its hospitality, and agreed to hold its next meeting early 2009 in Bangladesh, subject to the concurrence of the Government.

BOBP-IGO's Governing Council Holds Fourth Meeting in Dhaka

Fourth Meeting of the
Governing Council
6-7 May 2008, Dhaka, Bangladesh
BOBP

Delegates at the Fourth Meeting of Governing Council in Dhaka, Bangladesh.

The Fourth Meeting of the BOBP-IGO's Governing Council was held at the Bangladesh Agriculture Research Council, Dhaka, on 6-7 May 2008. Representatives of member-countries (Bangladesh, India, Maldives and Sri Lanka) took part, besides an observer from The WorldFish Center and the Secretariat of the BOBP-IGO.

Mr Manik Lal Samaddar, Special Assistant to the Chief Advisor, Ministry of Fisheries and Livestock (MoFL), Bangladesh, was the Chief Guest and chaired the inaugural session. Mr Syed Ataur Rahman, Secretary, MoFL, Special Guest; Mr Parikshit Datta Choudhury, Joint Secretary, MoFL; and Mr Rafiqul Islam, Director-General, Department of Fisheries (DoF) took part in the inaugural session, along with senior officials from the Bangladesh Agricultural Research Council; DoF; the Bangladesh Coast Guard; and representatives from industry and the media.

Welcoming delegates, Dr Y S Yadava, Director, BOBP-IGO, said the Organisation had completed five years of existence as an IGO and was well-recognized internationally. It had fruitful relationships with the FAO, the National Institute of Occupational Safety and Health, USA, the Swedish International Development Agency and several other international organizations. He thanked member-countries for their support.

Dr Yadava said that global marine fisheries is passing through a crisis for several reasons, ranging from anthropogenic impacts to climate change to excess fishing capacity. He urged member-countries to harness all available expertise and management capacity, and foster regional cooperation to address the complex problems of marine fisheries.

Mr Rafiqul Islam said that though fisheries contributes about 5.3 percent to the GDP of Bangladesh and is the second-biggest foreign exchange earner after garments, most marine fishers are poor and lack significant fishing assets. Most of the 40 000 mechanised fishing boats in Bangladesh are unregistered. He referred to the 'knowledge gap' among fishers about sea safety, weather conditions and the right fishing gear – which affects their well-being.

Mr Islam recalled with appreciation the development work of the erstwhile BOBP in marine fisheries and its role in fostering regional cooperation.

Mr Abdulla Naseer, Permanent Secretary, Ministry of Fisheries, Agriculture and Marine Resources, Maldives, and Chairman of the Governing Council, also complimented the BOBP-IGO and called for continued co-operation among member-countries through the IGO to address emerging issues.

Mr Syed Ataur Rahman expressed deep concern and sympathy for the victims of cyclone Nargis that hit coastal Myanmar on 04 May 2008, and for victims of cyclone SIDR that devastated lives and livelihoods in southern coastal districts of Bangladesh, especially in Barisal.

Mr Rahman said Bangladesh is yet to realize optimum yield from its aquatic wealth in the Bay of Bengal (BoB). He called for collective action by BOBP-IGO to tap the resources of the Bay in a sustainable manner. He recalled the IGO's work on initiating preparation of a management plan for hilsa fisheries, and the national workshop on sea safety for small-scale fishers (January 2008, Chittagong). He hoped that its outcomes would be implemented. He said Myanmar should be brought into the fold of the BOBP-IGO to help better fishery resource management of the Bay.

In his inaugural address, Mr Manik Lal Samaddar welcomed delegates and expressed condolences to victims of cyclone Nargis in Myanmar.

Mr Samaddar described the BoB as a valuable resource in terms of food, trade, employment and biodiversity. Fisheries and aquaculture therefore enjoy huge potential. But while marine fish production is stagnating because of unsustainable fishing practices, aquaculture has limitations due to limited water area.

Mr Samaddar said the BOBP-IGO is helping popularize the Code of Conduct for Responsible Fisheries (CCRF) and initiating action on monitoring, control and surveillance (MCS). The GCM should further enhance regional cooperation in fisheries and enable sustainable management and development of coastal fisheries in the region.

Mr Parikshit Datta Choudhury, Joint Secretary, MoFL proposed a vote of thanks.

Bangladesh was unanimously elected to chair the Fourth GCM. Dr Naseer (Maldives) thanked the Governing Council and the BOBP-IGO Secretariat for support during his tenure as chairperson of the Governing Council.

Report of the BOBP-IGO (March 2007-April 2008)

Dr Yadava presented the report of the BOBP-IGO for the period April 2007-March 2008. He described the BoB as a tropical ecosystem in a monsoon belt. Growth of capture fisheries over the past decade has been slowing, except in the Maldives. Millions of fishers in the Bay suffer the prospect of loss of livelihoods because of rising population, unsustainable fishing practices, habitat degradation and post-harvest losses. Further decline could be disastrous.

Dr Yadava described the activities carried out by BOBP-IGO under various heads. The safety at sea project implemented by the FAO through the BOBP-IGO (which is the South Asia component of the global project); the regional workshop on 'Monitoring, Control and Surveillance for Marine Fisheries in the Bay of Bengal; two regional consultations on preparation of management plans for hilsa and shark fisheries; translation of the Technical Guidelines on Marine Fisheries of the CCRF into Bangla and Telugu; publication of theme-based annual calendars, laminated placards on safety at sea; the quarterly newsletter ***Bay of Bengal News;*** and digitization of the organisation's visual archives.

Other supporting activities implemented during the year: Assistance to the International Cooperative Alliance in implementing a training project on "Promotion of Community-based Fishery Resource Management by Coastal Small-scale Fishers in Thailand"; collaboration with the UNDP and the Government of Orissa, in preparing a report on development of marine fisheries in Orissa; an expert consultation on "Low Cost Fisheries Management Strategies and Cost Recovery" held at Georgetown, Guyana, 4-7 September 2007; and a technical consultation on "International Guidelines for the Management of Deep Sea Fisheries in the High Seas", held in Rome, Italy, 4-8 February 2008.

Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources, Sri Lanka, said that his country is engaging the BOBP-IGO in various ways to take forward implementation of safety at sea programmes. He thanked the BOBP-IGO Secretariat, the FAO and member-countries who have supported safety at sea activities in the region.

Dr Abdulla Naseer said that safety-at-sea requirements of Maldives are unique in the sense that no serious accidents or mortalities occur. Fishing boats in the Maldives are well-equipped, different from those of other member-countries, and Maldivians are first-rate fishers. But the fleet is being modernized fast, and working knowledge on various communication and navigation devices needs to be improved. The Safety at Sea Project should include such training in its activities in Maldives. This would enable fishers to make multi-day fishing trips, as opposed to the single-day fishing in vogue now.

Dr Naseer said the incidence of illegal, unreported and unregulated (IUU) fishing in Maldivian waters was increasing. Fishers often report the presence of IUU fishing vessels, but the EEZ is large and it's difficult for their Coast Guard to patrol the entire area. He urged the Governing Council to consider the issue of illegal fishing and member-countries to work closely in the matter.

Mr M K R Nair (India), complimented the BOBP-IGO for its excellent accomplishments during the year. He asked whether BOBP-IGO activities are sufficiently gender-centric.
Dr V S Somvanshi (India), said that statutory measures are needed to support the Safety at Sea Project. The standards aimed at under the Project cannot be sustained in a statutory void, he said.

Mr Rafiqul Islam (Bangladesh), suggested that CCRF should be adapted to the needs of member-countries. He expressed concern over IUU fishing, and emphasized the need for effective MCS in marine waters.

While acknowledging the good work done so far, he suggested that the Secretariat consider taking up more activities for which additional funds could be mobilized. A mission and vision statement for the BOBP-IGO should be prepared for the next five years and placed for approval at the next meeting of the Governing Council. This should include a strategic action plan (SAP) for implementation.

Dr Giasuddin Khan (Observer, The WorldFish Center) complimented the BOBP-IGO for its work despite time and human resource constraints. He said that Bangladeshi fishers are more vulnerable to risks at sea than others; the minimum safety requirements on board fishing vessels should be promoted at the earliest. He urged a country-specific approach for proper implementation of the Code of Conduct.

He said the important work of the erstwhile BOBP over three phases should be reviewed to find out whether some useful follow-up could be done and recommendations still valid could be adopted. He said basic studies on the health of fish stocks are very important. Historical trends in fish production should be analysed to plan for the future growth of marine fisheries in the region.

Mr Piyasena, said that Sri Lanka was finalizing legislation for boat construction norms for presentation to Parliament. The Government proposed to convene a stakeholder consultation in this connection, and BOBP-IGO's assistance would be required to facilitate the process. He also said that a management plan was urgently needed for many important fishery resources that had got depleted. The Canadian International Development Agency was helping out with management plans for a few important fin and shell fish species, but more species needed to be included in the ambit of management plans. The BOBP-IGO could provide technical inputs for such plans.

Mr Piyasena said Sri Lanka fully endorsed the idea of a mission and vision statement for BOBP-IGO and formulation of a SAP.

Dr Naseer said the Dhivehi version of the CCRF, translated by the BOBP-IGO, was used extensively during the stakeholder consultations to finalise the new fisheries legislation of the country. Each and every participant at the Consultation was given with a copy of the Code.

He concurred with the idea of a mission and vision statement and a SAP for the BOBP-IGO. He said member-countries should guide the Secretariat in preparing the proposed road map, which was to be submitted to the Governing Council at its next meeting. The archives of the former BOBP and the documentation created by the BOBP-IGO should be put to maximum use, said Dr Naseer.

Dr Somvanshi was pleased with the programmes concerning safety of fishers, fishing boat construction and fish stocks. He said the outcomes of such programmes should be integrated into policy documents and legislation.

Responding to the various suggestions made, the Director of the BOBP-IGO said the objective of assimilating the principles of CCRF would be addressed in two stages. During the first, the document would be popularized among stakeholders by circulating translated versions of the main Code and its Technical Guidelines. Adapting the Code to meet local requirements should be attempted in the second stage.

About gender-focus activities, he said that the Secretariat proposed to conduct detailed studies on the role of women in fisheries. He asked member-countries to identify women consultants for the proposed study. About possible interventions in the cyclone-affected areas of Myanmar, he proposed that BOBP-IGO ask the concerned agency in Myanmar whether it would need technical inputs from BOBP-IGO.

The Chair remarked that BOBP-IGO had undertaken voluminous and important activities for development of marine fisheries during the year. The report of the Secretariat for April 2007-March 2008 was adopted.

Report on the Third Technical Advisory Committee (TAC) Meeting

The Secretariat presented the report of the Third Meeting of the TAC held at Beruwala, Sri Lanka, on 28-29 March, 2008.

Dr Giasuddin Khan enquired about the BOBP-IGO partnering organisations like SEAFDEC (South East Asian Fisheries Development Center) and BOBLME (Bay of Bengal Large Marine Ecosystem) that are active in marine fisheries. The Director, BOBP-IGO, said in reply that discussions have been going on with SEAFDEC on various activities. But the BOBLME is not fully functional yet. The Secretariat welcomed the suggestion of cooperation with these organisations.

The Bangladesh delegate said that a stock assessment exercise being carried out with support from the Islamic Development Bank and the Government of Malaysia would be completed within two years. India said the Fishery Survey of India could help out with stock assessment programme through bilateral or multilateral arrangements. The BOBP-IGO could facilitate such a process. The observer from The WorldFish Center suggested that capacity-building in stock assessment was vital and that this suggestion should be taken up on a priority basis.

Role of Technical Advisory Committee

The Director, BOBP-IGO said that the Third GCM had recommended that the Secretariat make a thorough assessment of the mandate and functions of the TAC and present a report to the Governing Council. The issue was raised at the Third Meeting of TAC. This meeting suggested that the TAC could *inter alia* play the following roles:

(i) develop the work plan for the Organisation,

(ii) suggest policy recommendations to the Governing Council, and

(iii) identify emerging issues in fisheries.

In general, the TAC members were satisfied with the functions of the TAC and appreciative of the tasks accomplished by the TAC. Members also felt the BOBP-IGO is just about five years old; it might be premature to examine the role of TAC at this juncture. Such reviews could be conducted after 10 to 15 years.

The Bangladesh delegate suggested that the DoF would be more appropriate than the Bangladesh Fisheries Research Institute (BFRI) to represent his country in the TAC.

The Governing Council suggested that a review of the role of TAC be taken up after five years *i.e.* in 2013. It also said that BFRI should continue to represent Bangladesh as a technical and research organisation.

The Governing Council accepted the Report of the Third Meeting of the TAC presented by the Secretariat.

IGO programme and activities for April 2008-March 2009

The Director, BOBP-IGO, presented the proposed programme and activities for April 2008-March, 2009.

The work plan proposed that BOBP-IGO continue with its capacity-building and resource management activities. The Secretariat would carry out two scoping studies on management of small-scale tuna fisheries and management of tiger shrimp fisheries and four new studies on alternative livelihoods, impact of fuel price hike on marine fisheries, impact of climate change on marine fisheries and capacity-building for improving food safety in marine fisheries. In addition, a vision and mission document and a SAP would be presented in the next meeting of the GCM.

In response, the GCM agreed to the following changes in the activities:

(i) For 'Fisherfolk Week' celebrations, the Secretariat will prepare documentaries on developmental issues relevant to the needs of each member-country.

(ii) On the engagement of local consultants, the process shall be initiated in consultation with the focal point in each member-country.

(iii) In the proposed study on "Impact of Fuel Price Hike on Marine Fisheries", a component on the impact on consumers and remedial measures may be included in the study.

(iv) The Secretariat may develop a base paper on "Preparation of National Plans of Action on IUU Fishing".

Administrative Matters

The Governing Council approved the appointment of M/s Varadarajan & Co, Chartered Accountants, Chennai, as auditors for the BOBP-IGO for 2007 and 2008. It agreed to the terms of reference proposed for the post of Senior Programme Advisor. The Secretariat was asked to circulate the vacancy announcement widely and write to member-countries as well for further circulation within ministries and departments.

The Governing Council also agreed to the Secretariat's proposal to recruit a Policy Analyst. The GCM approved the terms of reference for the post and suggested that this post also be publicized widely.

The idea of secondment of technical personnel from member-countries to the BOBP-IGO Secretariat for a period ranging from 12 to 18 months was agreed to in principle. The GCM asked the Secretariat to submit a detailed proposal to member-countries.

Other Matters

The Governing Council suggested that in future the BOBP-IGO may also play the role of a management advisory body in the region for sustainable development of fish stocks in the Bay of Bengal. The Secretariat was asked to prepare a note on the proposal for the next meeting of the Governing Council.

The Governing Council unanimously agreed that Myanmar should be requested to joint the BOBP-IGO. The Government of India was asked to take the lead in the matter.

The Governing Council thanked Bangladesh for hosting the fourth GCM and accepted India's offer to host the next meeting early in 2009. The Report of the Governing Council was adopted on 07 May 2008.

Developing World Working Group of the Marine Stewardship Council Meets in Brussels, Belgium

The Marine Stewardship Council (MSC) has set up a Developing World Working Group (DWWG) to advise the Council. The DWWG is an important specialist group of the MSC and meets annually. The second meeting of the DWWG was held in Brussels, Belgium on 26 April 2008. Dr Y S Yadava, Director of BOBP-IGO and a member of the DWWG, took part. Ms Meredith Lopuch of the Worldwide Fund for Nature chaired the meeting.

Ms Yemi Oloruntuyi of the Council provided a brief update on recent developments.

She said that MSC is doing pilot assessments of six small-scale fisheries. It is also researching exports (by origin and species) of small-scale fisheries to markets of the developed world.

The Council updated members on the status of projects suggested at the 2007 meeting of the DWWG. These included a trust fund for capacity-building; incentives for participation in the Marine Stewardship Council; guidance for NGOs of developing nations; and keystone projects.

The DWWG agreed that seafood trade among developing nations should be increased. It also discussed ways by which members of DWWG could discuss issues throughout the year rather than just once a year. It discussed three proposals in the meeting's agenda:

- Developing a template to certify action plans;
- MSC fishery associates; and
- Fishery certification training package.

Members evinced keen interest in the first and third proposals. They agreed that any training kit or tool for certification must include not only the economic and market benefits of certification, but also the environmental and political benefits. The tools should build on work already done in developing countries relating to ecological sustainability and management. A range of projects was discussed, including the GTZ development of tools to help fishers honour the Code of Conduct for Responsible Fisheries; the COBI and WWF pre-analysis tool; and the Parfish tool developed by MRAG, which is used in India.

Members pointed out that since MSC's core mission is environmental sustainability, it should focus on improving the fisheries environmental performance of members.

DWWG Members at the Meeting in Brussels.

The Working Group said it was necessary to raise awareness about the MSC and its programmes and their potential benefits in developing nations – including government and private managers and potential donors. Funding was needed to strengthen and improve fisheries and make it certifiable.

Marine Stewardship Council

The Marine Stewardship Council (http://www.msc.org) or the MSC is an international non-profit organization set up to promote solutions to the problem of overfishing. The MSC runs the only certification and eco-labelling programme for wild-capture fisheries consistent with the ISEAL Code of Good Practice for setting Social and Environmental Standards and the Guidelines of the Food and Agriculture Organization of the United Nations on fisheries certification.

Presently, over 160 fisheries are engaged in MSC programme with 43 certified, 102 under assessment and another 20-30 in confidential pre-assessment. Worldwide, more than 2 500 sea food products resulting from the certified fisheries seal the blue MSC eco-label. The estimated retail value of seafood products bearing the MSC logo is estimated around 1.4 billion US $ annually. MSC labeled products are currently available in 42 countries.

The MSC offices are located in London, Seattle, Tokyo, Sydney, The Hague, Edinburgh, Berlin, and Cape Town.

Chittagong Fishing Harbour

Photographs by S Jayaraj

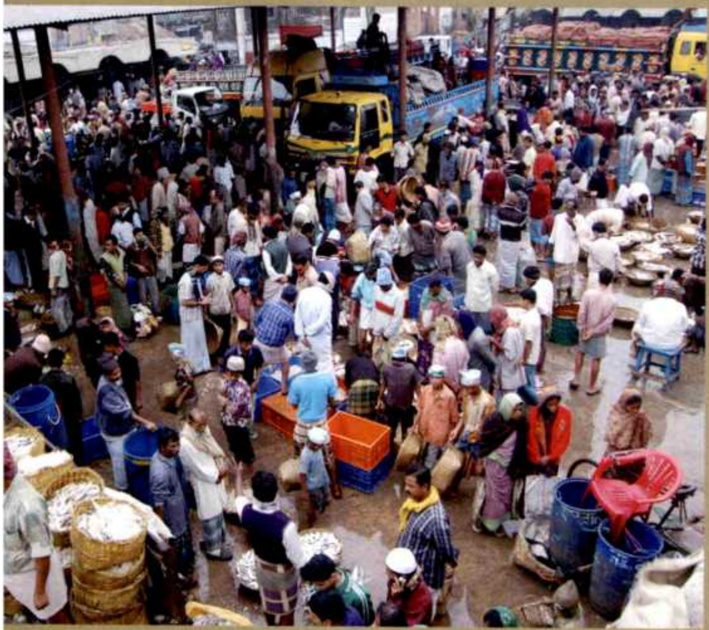
Text by S R Madhu

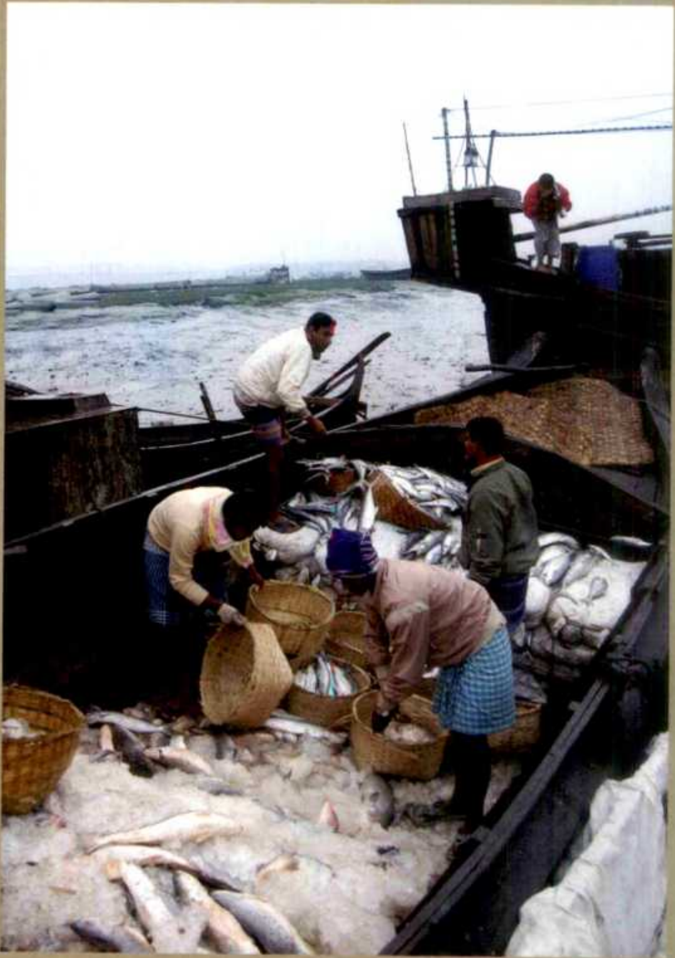
Chittagong fishing harbour best reflects the hurly burly of marine fisheries in Bangladesh – teeming with boats, fishermen and fish, with fish traders, vendors and labourers. Boats are setting out to sea or landing, buyers and sellers are haggling over the latest bonanza from the seas. Decibel levels are high as fish is unloaded, bargains are demanded and struck, and the fish moves out to markets in lorries, hand carts or cycle rickshaws.

The Chittagong fishing harbor, one of the biggest fish landing and berthing facilities in Bangladesh, includes the Patharghata Fishery Ghat and Monoharkhali BFDC (Bangladesh Fisheries Development Corporation) Ghat. Patharghata Fishery Ghat, a traditional landing site, handles more than 90 percent of the total fish landed in Chittagong. This Ghat has four fish landing points. While one point is operated by the Chittagong City Corporation, the other three are leased by the Chittagong Port Authority to private parties. The boats berth according to their convenience and pay Taka 200 per arrival and 2 percent of their total sale to the Point Authority. The Ghat Authority provides water, electricity and ensures security.

The adjacent Monoharkhali BFDC Ghat was established in the early nineties and has one landing point. Few boats land their catch at this ghat due to siltation problem. BFDC handles the catch at this site and the revenue earned from the commission accrues to the Government.

Some 46 percent of the 900 000 marine fishers of Bangladesh make their living from Chittagong and Cox's Bazar. The country's industrial fishery operates entirely out of Chittagong – you see industrial trawlers, gill netters, set bag netters, long lines and trammel nets – an





estimated 44 000 in 2006. Besides, small-scale fishermen make their living from the sea using dinghies, chandis and balams. The major fishing gear used in coastal areas and estuaries are gill net, set bagnet, trammel net, longline and beach seine.

Fisheries is one of the mainstays of the Bangladesh economy. It accounts for 4.86 percent of the GDP and 5.9 percent of exports, and supplies about 80 percent of the animal protein intake of its population.

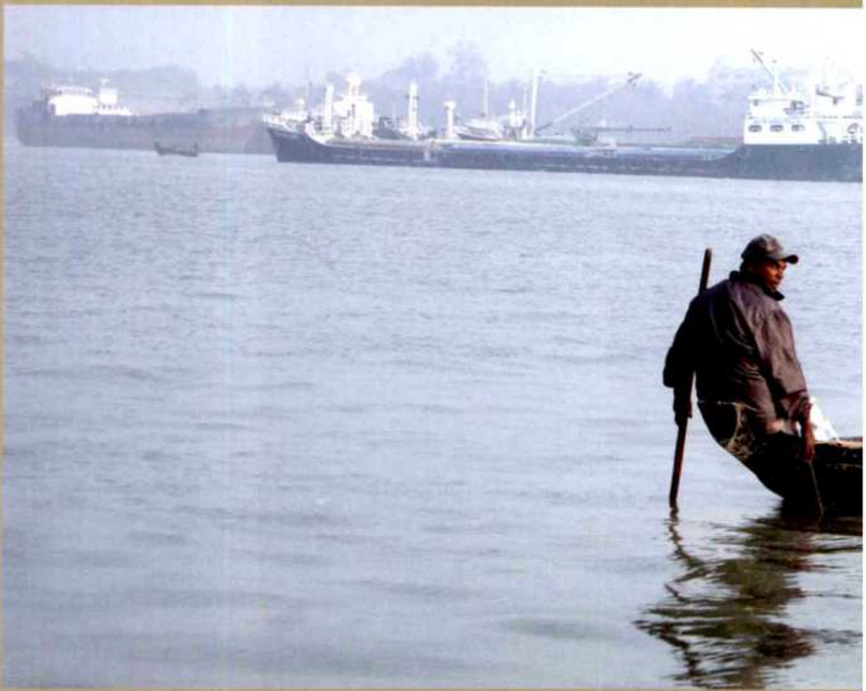
The country's marine fish catch in 2005-06 was nearly half a million tonnes. (Inland fisheries accounts for the bulk of fish production of about 2 million tonnes.) More than 90% of the marine fish is landed by artisanal fishers, and some half a million people make a living from marine artisanal fisheries.

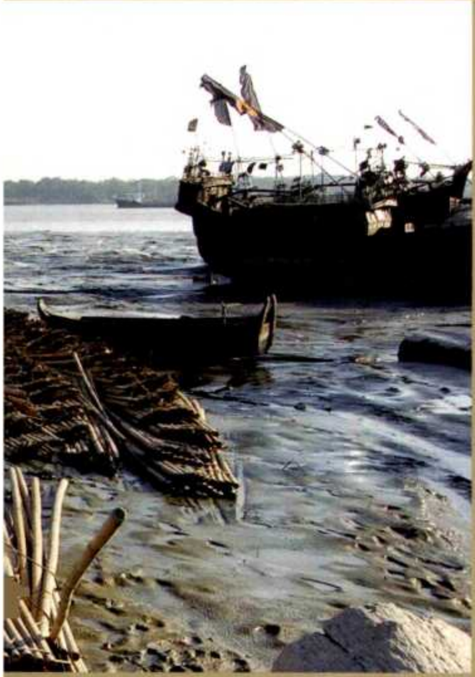
Important species caught include hilsa, catfishes, Indian salmon, sea perch, Bombay duck, snapper, pomfret, Indian mackerel, shark, rays and prawns. The industrial fleet focuses mainly on shrimps.

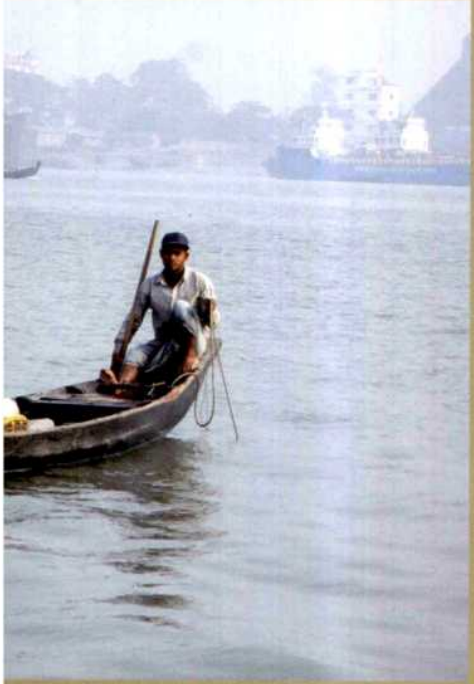
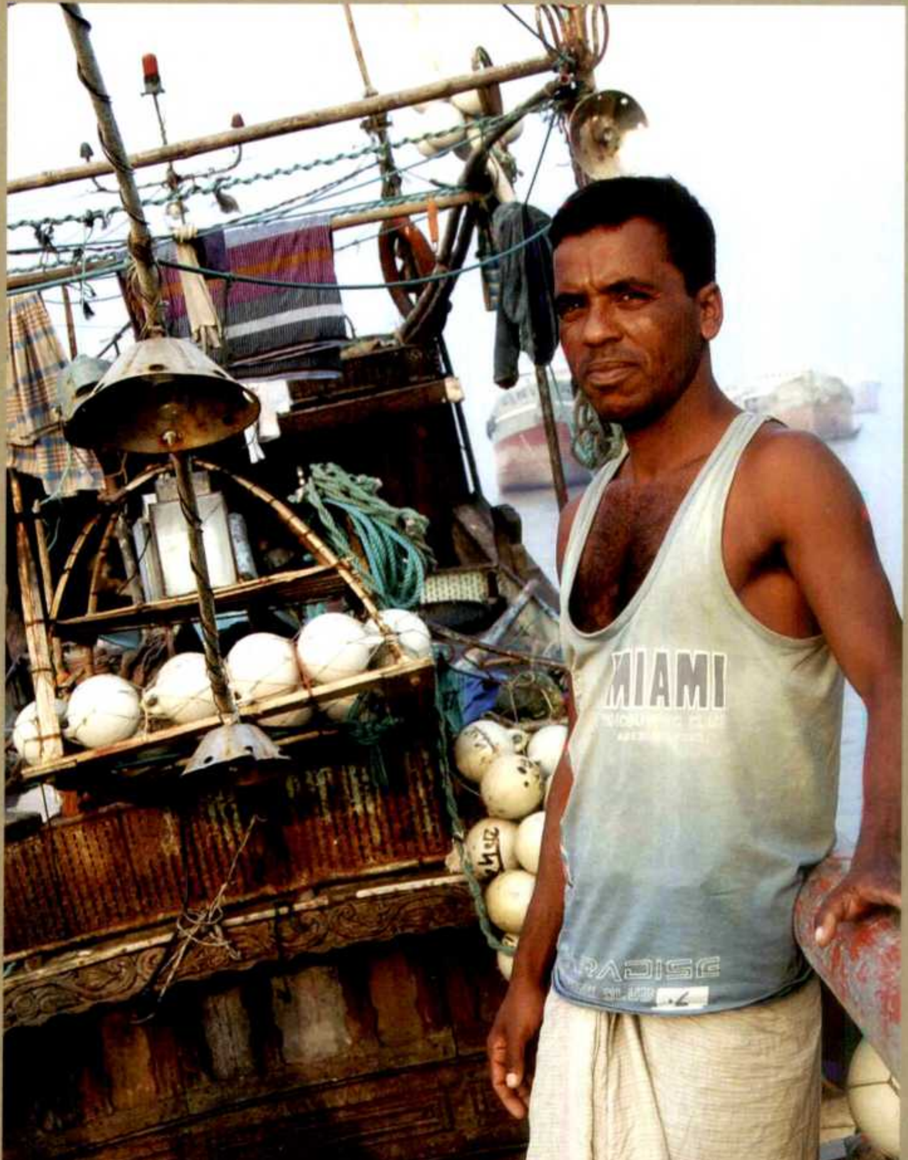
Over the years, the marine fishing fleet, of industrial as well as traditional craft, has expanded. But some stocks are being over-exploited, some others under-exploited, says Mr Md Rafiqul Islam, Director General, Department of Fisheries. Other problems with marine fisheries are lack of a reliable database, inadequate MCS (monitoring, control and surveillance), plus the impact of global warming and climate change.

Some of the solutions advocated are: management action to control fishing effort, to be supported by all stakeholders; access rights only to registered fishers; a marine resource database and an effective monitoring system.

The Chittagong harbour is life in the raw – the photographs on these pages provide glimpses. Harvesting the sea, for all its hazards, is perhaps easier for fishers than battling forces on land. Rarely is daily bread so hard earned.







MIAMI

Impact of Climate Change on Indian Marine Fisheries*

Is climate change the next apocalypse? Even optimists agree that it is one of the most critical global challenges of today. Research shows that climate change may impact agriculture and fisheries; endanger food security; trigger sea-level rise; lead to sea ice melting and glacier retreat; aggravate natural disasters such as floods, cyclones and droughts; accelerate the erosion of coastal zones; quicken species extinction and the spread of vector-borne diseases; cause coral bleaching and decline in biodiversity.

How has climate change affected India? Can governments and communities adapt to it? Both research and action on the subject are at a nascent stage. But recent studies throw some light on the subject.

We summarize here the observations and findings of two papers, by scientists from World Wildlife Fund-India (WWF) and the Central Marine Fisheries Research Institute (CMFRI) respectively. The authors are Dr Prakash Rao and Dr E Vivekanandan, who discuss how India's marine fisheries should adapt to climate change.

Impact of climate change on climatic parameters

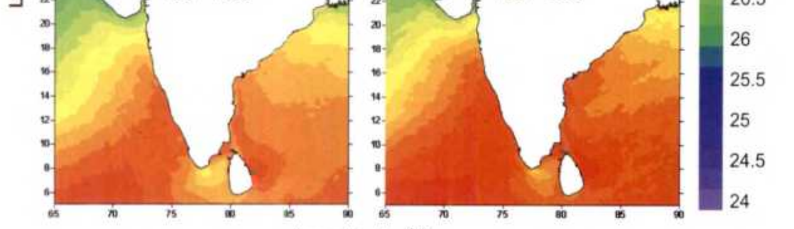
Evidence of the impact of global climate change on marine environments is ample. But it is regional rather than global climate models that are appropriate for observation and study of climate change impacts (Clark, 2006).

Analyzing data on sea surface temperature (SST) and other parameters from a variety of global sources, Vivekanandan et al. (2009a) found warming of the sea surface along the entire Indian coast. The SST increased by 0.2°C along the northwest, southwest and northeast coasts and by 0.3°C along the southeast coast during the 45-year period from 1960 to 2005. The team has predicted that the annual average SST in the Indian seas would increase by 2.0°C to 3.5°C by 2099.

Sea level rise in the Indian seas: The Inter-governmental Panel on Climate Change (IPCC) has projected that the global annual seawater temperature would rise by 0.8 to 2.5°C by 2050. The sea level would rise by 8 to 25 cm. The sea level rise for Cochin (southwest coast) during the past century is estimated at 2 cm (Emery and Aubrey, 1989; Das and Radhakrishna, 1993). But the rate of increase is accelerating. It may rise at the rate of 5 mm per year in decades to come. This will accelerate erosion and increase the risk of flooding (Nicholls et al., 1999).

Impact on marine fisheries

Production from marine capture fisheries has been stagnant during the past 10 years because of overfishing, unregulated fishing, habitat destruction and pollution; climate change may exacerbate this



Plot of SST showing warming of sea surface along the Indian coast during 1961-2005. (Source: ICOADS and AVHRR data from NOAA/NASA; the values near the vertical bar indicate SST (⁰C) situation. Warming of water may impact fish diversity, distribution, abundance and phenology. Acidification of water will affect calciferous animals. Storms, floods and drought will severely impair fisheries. Sea level rise will lower fish production and damage the livelihoods of communities.

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* *Based on articles contributed by Dr Prakash Rao and Dr E Vivekanandan. Dr Prakash Rao is Senior Coordinator, Climate Change and Energy Programme, WWF-India, New Delhi (Email: Rao@wwfindia.net). Dr Vivekanandan is Principal Scientist and Head, Demersal Fisheries Division, Central Marine Fisheries Research Institute, Cochin, Kerala, India (Email: evivekanandan@hotmail.com).*

Some tropical fish stocks may face regional extinction. Some others may move towards higher latitudes. Coastal habitats and resources are likely to be impacted through sea level rise, warming sea temperatures, extremes of nutrient enrichment (eutrophication) and invasive species. Most fish species have a narrow range of optimum temperatures related to their basic metabolism and availability of food organisms. Even a difference of 1°C in seawater may affect their distribution and life processes.

At shorter time scales of a few years, increasing temperature may result in changes in distribution, recruitment and abundance. Species with short-life span and rapid turnover such as plankton and small pelagic fishes are most likely to experience such changes.
At intermediate time scales of a few years to a decade, changes in distribution, recruitment and abundance of many species may be acute. Changes in abundance will alter the species composition.
At longer time scales of multi-decades, changes in net primary production and transfer to higher trophic levels are possible.

Investigations carried out by the Indian Council of Agricultural Research show that different Indian marine species will respond to climate change as follows:
(i) Changes in species composition of phytoplankton may occur at higher temperature; (ii) Small pelagics may extend their boundaries; (iii) Some species may be found in deeper waters as well; and (iv) Phenological changes may occur.

Changes in species composition of phytoplankton: Laboratory experiments on seven species of phytoplankton showed that some species may multiply faster at higher temperature (29°C) than at lower temperature (24°C). But they decay earlier at the higher temperature.

Small pelagics extend their boundaries: The oil sardine *Sardinella longiceps* and the Indian mackerel *Rastrelliger kanagurta* accounted for 21 percent of the marine fish catch in 2006. These small pelagics, especially the oil sardine, have been known for restricted distribution – between latitude 8°N and 14°N and longitude 75°E and 77°E (Malabar upwelling zone along the southwest coast of India) where the annual average SST ranges from 27 to 29°C.

Until 1985, almost the entire catch was from the Malabar upwelling zone, there was little or no catch from latitudes north of 14°N. During the last two decades, however, catches from latitude 14°N - 20°N are increasing. In 2006, catches in this area accounted for about 15 percent of the all-India oil sardine catch.

The higher the SST, the better the oil sardine catch (Vivekanandan et al., 2009a). The surface waters of the Indian seas are warming by 0.04°C per decade. Since the waters in latitudes north of 14°N are warming, the oil sardine and Indian mackerel are moving to northern latitudes. It is seen that catches from the Malabar upwelling zone have not gone down. Inference: The sardines are extending northward, not shifting northward. The Indian mackerel is also found to be extending northward in a similar way.

According to CMFRI, the catch of oil sardines along the coast of Tamil Nadu has gone up dramatically, with a record landing of 185 877 tonnes in 2006. The presence of the species in new areas is a bonus for coastal fishing communities. Assessing their socio-economic needs will greatly help in developing coping strategies for adaptation to climate impacts. WWF is currently documenting community perceptions and experiences in relation to the oil sardine fishery of the eastern coasts.

Indian mackerel is getting deeper: Besides exploring northern waters, the Indian mackerel *R. kanagurta* has been descending deeper as well during the last two decades (CMFRI, 2008).

The fish normally occupies surface and subsurface waters. During 1985-89, only 2 percent of the mackerel catch was from bottom trawlers, the remainder was caught by pelagic gear such as drift gillnet. During 2003-2007, however, an estimated 15 percent of the mackerel has been caught by bottom trawlers along the Indian coast.
It appears that with the warming of sub-surface waters, the mackerel has been extending deeper and downward as well.

Spawning: threadfin breams like it cool: Fish have strong temperature preferences so far as spawning goes. The timing of spawning, an annually occurring event, is an important indicator of climate change. Shifts in the spawning season of fish are now evident in the Indian seas.

The threadfin breams *Nemipterus japonicus* and *N. mesoprion* are distributed along the entire Indian coast at depths ranging from 10 to 100 m. They are short-lived (longevity: about 3 years), fast growing, highly fecund and medium-sized fishes (maximum length: 35 cm). Data on the number of female spawners collected every month off Chennai from 1981 to 2004 indicated wide monthly fluctuations.

However, a shift in the spawning season from warmer to relatively cooler months (from April-September to October-March) was discernible (Vivekanandan and Rajagopalan, 2009). Whereas 35.3 percent of the spawners of *N. japonicus* occurred in warm months during 1981-1985, only 5.0 percent of the spawners occurred in the same season during 2000-2004.

What about the cool months? During 1981-1985, 64.7 percent of the spawners occurred during October-March, whereas as high as 95.0 percent of the spawners occurred during the same season in 2000-2004.

A similar trend was observed in *N. mesoprion* too. The occurrence of spawners of the two species decreased with increasing temperature during April-September, but increased with increasing temperature during October-March over the time-scale. It appears that SST between 28 and 29°C may be the optimum. When the SST exceeds 29°C, the fish shifts the spawning activity to seasons when the temperature is around the preferred optima.

These changes may have an impact on the nature and value of fisheries (Perry et al., 2005). If small-sized, low value fish species with rapid turnover of generations are able to cope up with changing climate, they may replace large-sized high value species, which are already declining due to fishing and other non-climatic factors (Vivekanandan et al., 2005).

Such distributional changes might lead to novel mixes of organisms in a region, leaving species to adjust to new prey, predators, parasites, diseases and competitors (Kennedy et al., 2002), and result in considerable changes in ecosystem structure and function.

False Trevally populations decline in the Gulf of Mannar: As part of a WWF India-commissioned project, the Suganthi Devadason Marine Research Institute (SDMRI), Tuticorin, undertook a study in 2004 in the Gulf of Mannar region to analyze the effect of climate change on the fishery of False Trevally (***Lactarius lactarius***) and the reduction in the income of small - scale fishermen. The project helped identify the migratory patterns of the fish species.

False Trevally is an economically and culturally important fish in India and found near the Rameshwaram coast of south east India. The species is generally seen at depths ranging from 15 to 90 metres. But over the past few years, there has been a steady decline in the catch of this fish – both because of human disturbance and changes in ocean temperatures. Destructive fishing practices have also led to decline of the species. Result: the species has moved to other regions along the coast including the east coast of Sri Lanka.

Currently, it is difficult to find out how much of catch fluctuation is due to changes in fish distribution. A time-series analysis on stock biomass of different species along the Indian coasts does not exist. Moreover, catches are influenced by economic factors such as the relative price paid for different types of fish, and changes in fishing methods or fishing effort. For instance, introduction of mechanized craft in the 1960s, motorized craft in the 1980s, and large trawlers for multiday fishing in the 1990s substantially increased the fish catch along the Indian coast. These non-climatic factors often obscure climate related trends in fish abundance. Perhaps a de-trending analysis for removing the impact of non-climatic factors may help arrive at conclusions on the impact of climate change on marine fisheries.

The effects of changed fish migration and distribution caused by climate change are most difficult to deal with for highly migratory species, such as tuna. It is not clear whether the spurt in yellowfin tuna fishery in the Bay of Bengal and eastern Arabian Sea in the last five years is due to climate driven changes in the migration route of the fish.

Coral reefs may become remnants: Coral reefs are the most diverse marine habitat, which support an estimated one million species globally. They are highly sensitive to climatic influences and are among the most sensitive of all ecosystems to temperature changes, exhibiting the phenomenon known as coral bleaching when stressed by higher than normal sea temperatures. Corals usually recover from bleaching, but die in extreme cases.

In the Indian seas, coral reefs are found in the Gulf of Mannar, Gulf of Kachchh, Palk Bay, Andaman Sea and Lakshadweep Sea. Indian coral reefs have experienced 29 widespread bleaching events since 1989 and intense bleaching occurred in 1998 and 2002 when the

SST was higher than the usual summer maxima.

By using the relationship between past temperatures and bleaching events and the predicted SST for another 100 years, Vivekanandan et al. (2009b) projected the vulnerability of corals in the Indian Seas. They believe that the coral cover of reefs may soon start declining. The number of decadal low bleaching events will remain between 0 and 3 during 2000-2089, but the number of decadal catastrophic events will increase from 0 during 2000-2009 to 8 during 2080-2089.

Given the implication that reefs will not be able to sustain catastrophic events more than three times a decade, reef building corals are likely to disappear as dominant organisms on coral reefs between 2020 and 2040. Reefs are likely to become remnant between 2030 and 2040 in the Lakshadweep sea and between 2050 and 2060 in other regions in the Indian seas.

These projections take into consideration only the warming of seawater. Other factors such as increasing acidity of seawater are not considered. If acidification continues in future as it does now, all coral reefs would be dead within 50 years. Given their central importance in the marine ecosystem, the loss of coral reefs is likely to have several ramifications.

Impacts of climate change on coastal systems

Coastal India (with over 8 000 km of coastline) is a productive and ecologically diverse landscape. Climate change may aggravate the impact of injurious large-scale development and reduce the productivity of marine ecosystems.

The Fourth Assessment Report of the IPCC (2007b) has suggested that climate change is likely to significantly impact coastal India. Some possible impacts:

- *More hot days. More heat waves. More death from heat strokes in recent years;*
- *Intrusion of saline water into groundwater in coastal aquifer; and*
- *Decline in precipitation, droughts in most delta regions of India and drying of wetlands.*

Worldwide, WWF studies have brought out some important underlying impacts of climate change on marine ecosystems – such as a rise in SST, decreasing marine pH, shifting ocean currents, release of methane hydrates and rising sea level.

India is vulnerable to major climate changes because of a long coastline on the east and west and the Himalayan mountain range in the north. WWF- India has been working in some of India's most critical ecosystems and landscape. Its studies seek to probe climate impacts in the Sundarbans, the coastal regions of south India and in the Himalayas, and focus mainly on impacts and adaptation; mitigation; and policy interventions.

Sundarbans: The Sundarbans is part of the world's largest delta (80 000 sq. km) formed from sediments deposited by three great rivers, the Ganges, Brahmaputra and Meghna. It consists of 102 low-lying islands in the Bay of Bengal and forms one of the world's richest mangrove ecosystems (34 mangrove species). Faunal diversity is significant too, with a strong tiger population. The combination of terrestrial, freshwater and marine flora and fauna makes this one of the most diverse and productive ecosystems in the country.

The Sundarbans is now under severe stress due to sea level rise and associated problems. A population of four million in the Indian Sundarbans is severely stressed. Mangroves are under threat, so are endangered species like tigers and turtles. An effective coping mechanism to reduce the vulnerability of the region is essential.

WWF- India is documenting local community knowledge and climate perceptions through an initiative known as 'Climate Witness'. It was launched because of the strong indicators of climate change from various scientific studies. WWF-India hopes that this initiative will make the authorities integrate climate change concerns into development planning through a bottom-up approach.

Characteristics of the initiative:

- *Stakeholders at different levels will help develop a model intervention;*
- *A homogeneous geographical area will be identified to validate the model; and*
- *Local concerns on climate change will be integrated into development planning.*

Islands selected for the 'Climate Witness' initiative studies are mostly in the southwestern corner of Sundarbans (except Chhoto Mollakhali and Bali islands situated in the northeastern part of the delta).

Local communities in these sites were more concerned by weather phenomena (such as monsoon delays in recent years), than by rising temperatures. Local residents reported very high frequency of thunder and lightning during storms in last 10-15 years. In their opinion depression and cyclonic storms occurred more frequently than earlier. Delayed monsoons and untimely rain impaired agricultural productivity leading to loss of crops and increased pest attacks.

Community interactions and adaptation responses

The WWF- India has been studying the coping capacities of communities – particularly in those islands where landmass has been lost over the past few decades. Community knowledge is being classified on environmental impacts like soil erosion, loss of landmass, damage of coastal embankments, siltation, unsustainable livelihood practices, population pressure, storms and cyclones, effect of tidal waves, etc.

Farmers and fishermen (both depend on the ecosystem) form a major part of the work force of these islands. Since industry isn't developed, livelihood options are limited. Nearly 61.85 percent of the respondents surveyed were farmers or fishermen. Nearly 10 percent were full-time fishers. A majority of the inhabitants were vulnerable to climate-related adversities.

In response to climate change, village communities have been taking short-term actions such as:

- *Shifting the farming time because of shifting of monsoon season;*
- *Diversifying into different weather-resistant crops;*
- *Constructing and renovating ponds and canals for rain water harvesting and use in winter cultivation;*
- *Constructing mud-barrages around the islands to protect them from saline water intrusion; and*
- *Reforesting of mangroves on the mud barrage.*

WWF- India says that in communities dependent on ecosystems, different stakeholders must come together to address climate change and environment security. They could develop site-specific measures at the local level, evolve a consensus for national strategies, and support inter-governmental processes.

The stakeholders would include the very poor; farmers and fishers; local, state and national bodies; urban consumers; business and industry; groups concerned with coastal zone regulation; scientists and academics.

When stakeholders at different levels are brought together on a common platform, climate change concerns can be better integrated into development planning. Resource centers and local knowledge networks can raise awareness and strengthen action. Some other institutional processes can also be established.

How can fisheries adapt?

Options for adaptation are limited, but do exist. The impact of climate change depends on the magnitude of change, and on the sensitivity of particular species or ecosystems (Brander, 2008).

Develop knowledge base for climate change and marine fisheries: Considerable effort should be made to collect historical climatic and oceanographic data – in addition to monitoring these key parameters. Long-term environmental and ecological monitoring programmes are important as such data cannot be collected retrospectively. In India, spatial marine fish catch and effort data are available for the last four decades. However, a synergy between the climatic and oceanographic data and fisheries data is needed. Projections on climate change impact on fish populations have not been performed so far. Such projections need to be developed as the first step for future analytical and empirical models, and for planning better management adaptations.

Adapt the Code of Conduct for Responsible Fisheries (CCRF): Fish populations are facing the familiar problems of overfishing, pollution and habitat degradation. Reducing fishing mortality in the majority of fisheries, which are currently fully exploited or overexploited, is the principal means of reducing the impacts of climate change (Brander, 2007). Reduction of fishing effort (i) maximizes sustainable yields, (ii) helps adaptation of fish stocks and marine ecosystems to climate impacts, and (iii) reduces greenhouse gas emission by fishing boats (Brander, 2008).

Some of the most effective actions which we can take to tackle climate impacts are to deal with the old familiar problems such as overfishing (Brander, 2008), and adapt the CCRF and Integrated Ecosystem-based Fisheries Management (FAO, 2007).

Increase awareness on the impacts of climate change: Being a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), India has submitted the first National Communication to the UNFCCC in 2004. The second National Communication is under preparation for submission in 2011.

National climate change response strategies are under preparation. A specific policy document on the implications of climate change for fisheries needs to be developed for India. This document should take into account all relevant social, economic and environmental policies and actions including education, training and public awareness related to climate change. Effort is also required to raise awareness of the impact, vulnerability, adaptation and mitigation related to climate change among all stakeholders.

Strategies for evolving adaptive mechanisms: In the context of climate change, the primary challenge to the fisheries and aquaculture sectors will be to ensure food supply, enhance nutritional security, improve livelihoods and economic output and ensure ecosystem safety. These objectives call for identifying and addressing the concerns arising out of climate change and evolving adaptive mechanisms and implementing action across all stakeholders at national, regional and international levels (Allision et al., 2004; Handisyde et al., 2005; WorldFish Center, 2007; FAO, 2008).

Strategies to promote sustainability and improve supplies should be in place before the threat of climate change assumes greater proportion. While the fisheries sector may strive to mitigate climate change by reducing CO_2 emissions, especially by fishing boats, it could reduce impact by following effective adaptation measures. There should be fiscal incentives for reducing the sector's carbon footprint, and for following other mitigation and adaptation options.

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Regional Workshop on Monitoring Control and Surveillance Adopts the Chittagong Resolution

Regional Workshop on
Monitoring, Control and Surveillance
The Peninsula Chittagong

The Regional Workshop on MCS in progress.

The first regional workshop on Monitoring, Control and Surveillance (MCS) for marine fisheries in the Bay of Bengal was held in Chittagong, Bangladesh, on 16-18 January 2008. Fisheries officials and representatives from the coast guard and the navy of member-countries (Bangladesh, India, Maldives, and Sri Lanka) took part, besides consultants, representatives of the FAO and the BOBP-IGO.

The inaugural session was chaired by Mr Parikshit Datta Choudhury, Joint Secretary, Ministry of Fisheries and Livestock (MoFL), Bangladesh.

Welcoming participants, Mr Datta Choudhury emphasized on the danger to marine resources posed by increasing fishing effort. He hoped the workshop would pave the way for effective policy formulation on MCS in member-countries.

The workshop was divided into technical presentations and discussions; a field trip; and group discussions to analyze issues and recommend action.

Summary of the technical session

Dr Yugraj Singh Yadava, director of BOBP-IGO, initiated the technical session with an overview of MCS measures in member-countries. He said the rapid increase in the fisher population in an open-access regime has led to low catches and fishing rights conflicts. Member-countries are not ready yet for a paradigm shift in policy emphasis from production to management. The legal framework is insufficient, policies for fisheries management are inadequate and compliance levels are low. Citing FAO data, he said that in the Bay of Bengal region, of 46 commonly exploited species, 11 species are fully exploited and four are fully or over-exploited.

He said that MCS ought to go beyond its traditional definition of policing. It should be seen as a path to sustainable fisheries. An array of tools was available for MCS – legislation, data collection, improved communication and overall support from political, social and business interests. He highlighted the importance of a vessel monitoring system (VMS) for MCS.

Dr Yadava suggested that member-countries seek cooperation from advanced countries on MCS – in data and technology, for example – as proposed by the Code of Conduct for Responsible Fisheries (CCRF).

Mr Arne Andreasson, an independent consultant, made a presentation on "Application of MCS in small-scale fisheries". He said that MCS systems have mainly been designed for the industrial fisheries of developed countries. Special MCS systems are needed for small-scale fisheries – which are scattered, with many small units operating close to the shore, employing a wide range of gear, and landing fish at numerous small and remote landing centres.

These special systems would include monitoring through random sampling and the use of modern communications technology by the enforcing authority. Limits on effort through access regulations (licensing of fishing vessels, for example), closed seasons, closed areas and gear restrictions, are enforceable measures.

He said that all MCS systems are costly – but not in relation to the cost of not managing the resource at all. Efforts to decentralize management decisions and move towards co-management and community management would lead to cost-effective MCS systems, with elements of self-control.

Discussing MCS in Bangladesh, Commander A R Chowdhury from the Bangladesh Coast Guard said that small-scale fisheries accounts for about 93 percent of the Bangladesh fish production of 2.1 million tonnes.

The marine fishing fleet (industrial trawlers, gill netters, set bag netters, long lines and trammel nets) increased from 17 385 to 44 082 between 1997 and 2006.

He said Bangladesh had already implemented various control measures, such as limits to fishing days, control of mesh sizes, restricting trawling to within the 40 m depth zone, guidelines for fish capture, declaration of a sanctuary for hilsa. The government is registering boats and encouraging alternative livelihoods for fishers. Despite these measures, MCS on small-scale fisheries is very inadequate, Mr Chowdhury said. Only 15 to 20 percent of the country's fishing vessels are registered. Registration and licensing are multi-window processes that discourage fishers. The licensing fee is perceived as high, it has to be renewed annually.

Speakers at the Regional Workshop (from top to bottom): Mr Arne Andreasson, Mr Nimalsiri Abeywickrama, Cdr A R Chowdhury, Dr V S Somvanshi, Capt. Ahmed Jihad and Mr Mohamed Shameem.

The Bangladesh Coast Guard and the Navy, responsible for enforcement as well as search and rescue operations, are constrained by manpower shortage and lack of air support. Illegal fishing is widespread, foreign vessels engage in poaching.

Mr Chowdhury suggested that Bangladesh learn from the experience of countries like Malaysia in designing a cost-effective MCS regime. The country's surveillance system needed to be upgraded. VMS, over-the- horizon radar and a strong Coast Guard were essential, as also . well-coordinated research to advance the MCS regime.

Discussing the status of MCS in India, Dr V S Somvanshi, Director General, Fishery Survey of India, said that India is endowed with 8 118 km of coastline, 0.53 million sq. km of continental shelf and 2.02 million sq. km of EEZ. Fisheries contributes 1.07 percent to the total GDP. India's fish biodiversity represents nearly 10 percent of the world's fish biodiversity. Fisheries in India is complex because of its multi-species, multi-gear, multi-craft and multi-stakeholder character.

The Ministry of Agriculture (2001) has estimated the potential yield from marine sources as 3.92 million tonnes. The present exploitation level is about 76 percent of the potential. The country has some 3.57 million marine fishers and a fishing fleet of 0.3 million. An open-access system leads to uncontrolled exploitation. Illegal, Unreported and Unregulated (IUU) fishing further aggravates the problem.

Registration of fishing vessels in India follows stipulations under different Acts for vessels < 20m and vessels > 20m. But there is no uniformity either within a state or between states. A standard system throughout the country would be a priority. Regional co-operation would help curb IUU fishing.

The paper proposed standardization of craft and gear; zonation of sea fishing areas; a colour code for fishing boats; a uniform system of registration; installation of VMS; strengthening of the fisheries database; information networking for fisheries; awareness-raising among fishermen on resource management.

Mr Mohamed Shameem, Ministry of Fisheries, Agriculture & Marine Resources (MoFAMR), Maldives, and Capt. Ahmed Jihad of the Maldives Coast Guard, discussed the status of MCS in their country. They said the island nation of Maldives has more water than land, and marine fisheries is the strongest traditional sector. The country has a total population of just over 300 000 scattered over 200-odd small coral islands.

The major fisheries are pole and line fishing for skipjack tuna; hand lining and long lining for yellowfin and bigeye tuna; reef fisheries targeting different species; and a small yet profitable aquarium fishery targeted at export markets.

The major governing regulation is the Fisheries Act of 1987. It is presently being revised to take into account changes in management needs and international obligations. MoFAMR is the lead agency tasked with fisheries management and development in the country. It is supported in the execution of its mandate by the Fisheries Advisory Board (FAB).

Compliance is a major problem, the two authors said. Some reasons for non-compliance: lack of awareness, inconsistencies in regulations issued by different ministries, inadequate enforcement capacities, the socio-cultural environment of small island communities that rely on community cohesion and solidarity. Maldives has implemented a Vessel Tracking System (VTS) for all vessels licensed to operate in the outer EEZ. Established in 1995, the VTS is monitored by the Maldivian Coast Guard. This is done by installing vessel-tracking transponder equipment on board the vessel. Frequent power failure and absence of written rules in operating transponders impair the efficacy of the system.

Maldives plans motivating fishers to regulate themselves. MoFAMR will provide fishing forecast information free of charge exclusively to registered fishing vessels. Fishers will then be encouraged to install VMS systems: better catches for them, systematic vessel information and catch reports for MoFAMR. This will encourage boat registration and enhance sea safety as well.

Mr Nimalsiri Abeywickrama, Director (Planning), Ministry of Fisheries & Aquatic Resources (MoFAR), Sri Lanka, presented a paper on the status of MCS in his country. He said Sri Lanka's marine fishing fleet of some 43 000 includes more than 39 000 in coastal fisheries. Some 600 000 people depend on the coastal fishery. Small-scale crafts, about 90 percent of the fishing fleet, contribute about two-thirds of the domestic fish production.

The December 2004 tsunami triggered uncoordinated and un-monitored restoration effort and a big rise in the number of fishing boats; consequently, lower catch per unit effort and income from coastal fisheries. Harmful, IUU fishing has also gone up.

The Department of Fisheries and Aquatic Resources (DFAR) is the agency that enforces various Acts. Other key agencies for fisheries management in Sri Lanka are the MoFAR, the National Aquatic Resources Research & Development Agency and the National Aquaculture Development Authority.

The paper said that coastal fisheries in Sri Lanka have either reached the maximum sustainable yield or are close to it. A management programme has been launched for coastal fisheries. Seven hundred areas have been set apart for management through community participation. Alternative income opportunities for fishers are to be created to reduce fishing pressure.

Strengthening of MCS and introducing a vessel monitoring system will be other priority areas. Assistance and co-operation will be necessary from regional and global management organizations.

Summary of group discussions

Three groups were constituted to discuss different aspects of MCS — physical environment requirements (Group I); governance and policy environment requirements (Group II) and the role of CBOs/ NGOs in setting up MCS regime (Group III).

According to Group I, comprehensive stock assessment is necessary to determine the fleet's optimum size for sustainable exploitation. The right fleet size and gear can be then worked out, and category-wise operational area of fleets defined. This will also help reduce inter-category conflict. Registration of vessels should be mandatory. Awareness should be built to foster a culture of registration.

The group said that VMS should be mandatory for large vessels. For small vessels, measures like colour-coding and display of flags and registration numbers, could be considered as part of the VMS.

Encouraging community participation in MCS and SAR operations is urgently necessary, the group said. NGOs can be effective in this context. For harbour-based vessels, governments can introduce a smart card and a harbour pass. Two-way communication (VHF and cell phone) could be promoted to enable both MCS and distress communication. Local communities equipped with internet access could be tapped to provide needed information.

Group II said that existing MCS legislation in member-countries should be revised. An information base is lacking, and mechanisms for collecting, collating and disseminating national statistics are inadequate. All stakeholders should take part in making data collection effective. The group lauded the MCS regime in Maldives and urged stakeholder consultations for developing any MCS regime.

Steady budget support is essential for MCS, the group said. It can be used commercially, as in the Maldives, to make it popular. Given the shared stock of member-countries, regional cooperation is must for a successful MCS. There is also scope for sharing information to curb IUU fishing.

Group III suggested that community-based organisations (CBOs) could help enforce MCS. In fact, fishers should be able to help enforce MCS through CBOs, with NGOs serving as facilitators. The government should incorporate fisher concerns into the management regime.

The group found that co-management will not work without legal empowerment of CBOs. On the other hand, there is a risk of power misuse by CBOs. The practical solution at present is for CBOs to work with the government.

The group recommended a micro-level exercise by government to determine the norms for scientific and environment-friendly MCS, depending on the type of craft, fish species, time of the year and gear type. This should be carried out and published. Accordingly, an area-specific management plan could be set out.

The group concluded that a CBO network could help ensure a sound MCS in fisheries, if properly conceived and designed, with an accompanying legal, management and financial framework.

On the final day of the regional workshop, participants passed the Chittagong Resolution on the basis of the group recommendations. The text of the resolution is given on page 42.

Participants engaged in Group Discussions.

The Chittagong Resolution

Conscious that the marine fisheries sector is highly important for the economies of member-countries of the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO);

Recognizing that the marine fisheries sector is a major contributor to the livelihoods, food and nutritional security and foreign exchange earnings of member-countries;

Realizing that a high percentage of the world's artisanal fisheries and small-scale fisheries are concentrated in South Asia, where many of the coastal stocks are almost fully exploited;

Recognizing that the marine fisheries sector largely operates in an open-access regime, and that the present condition of fisheries is largely attributable to weaknesses in the institutional and regulatory environment, a declining resource base and poor socio-economic conditions;

Realizing that monitoring, control and surveillance (MCS) regimes are weak in the marine fisheries sector of member-countries;

Concerned about the social and political constraints to regulating access to marine fisheries and to optimizing the fishing fleet;

Concerned that the current fisheries management regime for coastal fisheries in the region may lead to further unsustainable levels of exploitation of fisheries resources, and thereby impact the livelihoods of small-scale fishermen;

Concerned that the supporting regulations and policy framework relevant to the needs of MCS for small-scale fisheries, remain inadequately addressed by fisheries and maritime administrations in the sector;

Recognizing the limitations in institutional capacity of fisheries and maritime administrations in the region to undertake all responsibilities associated with the mandate;

Recognizing that the 1995 Code of Conduct for Responsible Fisheries (CCRF) of the FAO does not adequately address the need and requirements of MCS in small-scale marine fisheries;

Emphasizing the urgent need to address the multi-dimensional issue of MCS for small-scale fishermen in a holistic manner; and

Recognizing that the problem is not insurmountable;

We, the representatives of Fisheries and Maritime Administrations, Coast Guard and Fishermen's Associations, nominated by the Governments of Bangladesh, India, the Maldives and Sri Lanka, having participated in the BOBP -IGO Regional Workshop on MCS for Small-scale Fisheries held in Chittagong, People's Republic of Bangladesh, from 16 -18 January 2008, now therefore:

Resolve to address, as a matter of urgency, the issue of MCS for small-scale fisheries;

Recommend that MCS requirements be comprehensively integrated into every member-country's fisheries policy and regulatory and managerial frameworks. This would include associated commitments under the CCRF and other regional, inter-regional or global instruments and initiatives;

Emphasize the need to rationalize institutional mandates and inter-sectoral cooperation at the national level, in order to enhance implementation of MCS in small-scale fisheries;

Recommend that fisheries and maritime administrations enhance their knowledge and database on the health of the fish stocks and on commensurate efforts required to harvest resources in a sustainable manner;

Recommend the development and implementation of education, training and awareness programmes which satisfy and promote MCS requirements;

Recommend that mandatory requirements for improving implementation of MCS be supplemented by other strategies which involve the participation of fisher communities, families, the media and other stakeholders in order to promote the adoption of a wide range of MCS measures;

Recommend that member-countries, while implementing MCS, also undertake measures to enhance the economic viability of small-scale fishing enterprises, as an essential element of the marine fisheries sector;

Recommend that member-countries make full use of the available technologies, including Vessel Monitoring System wherever feasible, in support of MCS;

Recommend that member-countries employ innovative measures such as co-management. This will be an effective cost-sharing measure for MCS and enhance the participation of fishers and other stakeholders in the management of marine fisheries resources;

Recommend that member-countries undertake measures to formulate time-bound action plans for successful implementation of MCS and for strengthening the national agencies responsible for MCS;

Recommend that member-countries undertake measures directed towards regional cooperation in ensuring successful implementation of MCS; and

Strongly recommend the formation and implementation of a regional MCS programme, employing a consultative and participatory approach, building upon institutionally derived data and the operational experiences of small-scale fishermen.

Adopted on Friday, 18th January 2008 in Chittagong, Bangladesh.

Participants Laud Regional Training Course on Code of Conduct for Responsible Fisheries

The rapid depletion of fish stocks is a major challenge for fisheries managers worldwide. Confronting this challenge, the FAO spearheaded a global agreement on the Code of Conduct for Responsible Fisheries (CCRF), which was adopted by member-nations in October 1995.

The Code was hailed as a landmark global initiative in fisheries. But even 13 years after its adoption, the Code has not been properly understood by many stakeholders, especially in developing countries. One reason is the complex phrasing and legalistic language of the Code.

To create awareness among junior and middle-level fisheries officers of member-countries of the BOBP-IGO (Bangladesh, India, Maldives and Sri Lanka), a two-week Regional Training Course on CCRF was organised by the BOBP-IGO from 16 to 27 June 2008 in Chennai and Mumbai, India.

In Mumbai, the Central Institute of Fisheries Education (CIFE), a deemed university, helped conduct the training. Four participants from each country took part.

The course was inaugurated in Chennai on 16 June 2008. Dr Dilip Kumar, Director and Vice-Chancellor, CIFE; Dr V Sampath, Ex-Advisor, Ministry of Earth Sciences; and Dr H Kasim, Principal Scientist and In-charge, Central Marine Fisheries Research Institute (Chennai base) took part as guest speakers.

Welcoming participants, Dr Y S Yadava, Director, BOBP-IGO, said the course was in pursuance of the IGO mandate of capacity-building in member-countries.

The Participants at the Regional Training Course on CCRF.

Dr Yadava described the Code as a comprehensive document meant to address fisheries issues in a practical manner. The BOBP-IGO had earlier organised national workshops on the CCRF for senior policy makers of member-countries. The present training course would help build a cadre of middle-level officers conversant with the Code and its Technical Guidelines. He hoped the course would bridge the prevailing knowledge gap on the Code in member-countries.

Dr V Sampath said that though the Code is a voluntary document, it has many references to international laws and conventions and is therefore binding on countries. The Code would facilitate interaction among participants who could learn from one another. He congratulated the BOBP-IGO for organizing the course.

Dr Kasim said the Code provides clear guidelines for fishers on what is expected from them, and for administrators on how fishers can be made a part of the process of fisheries governance. Citing examples from the field, he said the Code's principles are hardly implemented. Whenever a fisher is asked to curb effort, he agrees, but looks over the shoulder at his neighbour who isn't doing so!

Just as panchayats are now being empowered politically, village-level bodies should be empowered to enforce CCRF, Dr Kasim said. Fishers will then have a greater voice in decision-making. Dr Kasim hoped that in future, such courses would include more participants from member-countries and from other neighboring countries as well.

Dr Dilip Kumar, chief guest of the inaugural session, said that the course could help take the Code to the grassroots through middle-level and junior fisheries officials of member-countries. He said the Code is comprehensive, and every country can adapt the Code to its own needs.

The CIFE was happy to partner the BOBP-IGO in conducting the course. He hoped the partnership and the experience would lead to even better courses in future.

The pedagogical session of the course began with a lecture by Dr Yadava on the BOBP-IGO, its mandate, role, objectives and programmes. He discussed the transformation of the BOBP to an Inter-Governmental Organisation and its role in promoting sustainable fisheries in member-countries.

Dr Sampath then provided a 'historical overview' of various fisheries management approaches in the Bay of Bengal region. He discussed the evolution of fisheries management in the Bay and the transformation of focus from economic growth to sustainability.

Day 2 began with a lecture by Dr Yadava on the CCRF, its nature and scope. Describing the Code and its 12 Articles, Dr Yadava said the Code takes into account all aspects of fisheries. He cited examples of various activities in member-countries that in effect exemplify the Code. But it should be adapted better to the requirements of member-countries and involve all stakeholders.

Dr Sampath discussed the "International Plan of Action (IPOA) for reducing incidental catch of seabirds in longline fisheries and conservation of shark". He said that on the basis of IPOA, states were required to start implementing 'national plans' no later than 2001. He urged BOBP-IGO member-countries to start preparing national plans at the earliest.

Dr Yadava presented the "International Plan of Action on management of fishing capacity and to prevent, deter and eliminate Illegal, Unreported and Unregulated (IUU) Fishing". He said the first part of the IPOA called on countries and regional fisheries organizations to achieve efficient, equitable, and transparent management of fishing capacity worldwide by 2005. The second part – on IUU fishing – is a practical and action-oriented 'toolbox' of measures which states can use to act either directly or through regional fisheries organizations.

Mr Rajdeep Mukherjee (BOBP-IGO) discussed the Code's Technical Guidelines. He said 10 guidelines and supplements had been published so far by the FAO. They are meant to help formulation of an action plan to implement the Code. Mr Mukherjee said that in fisheries management, differentiating the actual cause of the problem from the apparent causes is a key.

Mr Rathin Roy (former BOBP staff) spoke on "Coming together to manage fisheries". He explained the importance of co-operative action by all stakeholders in implementing the Code, and urged that action should focus not merely on fisheries management but also on fisheries governance.

Ms Chandrika Sharma (International Collective in Support of Fishworkers) discussed the 'gender perspective' in taking the Code to the grassroots. She said that the earnings of fisherwomen go directly into family well-being, into food and education. Hence the inclusion of women in fisheries objectives is a must. She highlighted the poor working conditions at landing centres – particularly their sanitation and the facilities for crèches – and called for a determined effort to improve them.

Field visits

Field trips were organized on Day 3 of the course, beginning with a stakeholder meeting in Chinna Neelankarai, a small fishing village on the outskirts of Chennai, in Kancheepuram district.

The Assistant Director of Fisheries (Marine), of the district, coordinated the visit. Course participants visited the berthing places of FRP boats on the beach and talked to fishers about fishing areas, the condition of their craft and gear, the catch composition, etc. They then met 21 traditional fishermen from five neighboring villages at the village community hall.

Course participants asked fishers whether they knew about the Code and its provisions on fishing operations, safety at sea, the role of women in fisheries. How could the Code be implemented better?

Fisher representatives said some of them had read the Tamil translation of the Code and talked about it with others. Most of them accepted the Code's principles and complied with rules and regulations on matters like registration and licensing of boats. However, they were concerned about decline in resources, increase in the number of boats and use of small mesh sizes by other groups of fishers. Other points: Trawling is hurting their livelihoods. Vessel-shore communication facilities, essential for safety at sea, are poor. Women are active in fish marketing and dry fish making.

Responding to queries from course trainees, the fishers said that village panchayats help mitigate conflicts among mechanized and non-mechanized fishers. But the fishers expect the government to implement regulations better and to improve infrastructure such as fish landing centres. Fishers on their part have constructed artificial reefs to improve fish habitats; they expect the government to supplement their efforts. Course trainees thanked the fishers for their time and insights.

On the fourth day, trainees visited the fishing harbour at Puducherry, where the Deputy Director of Fisheries explained basic facilities set up there (such as berthing for 110 mechanized boats and 110 motorized boats). The trainees then visited another fishing village, Solai Thandavan Kuppam, where they were welcomed with shawls by the fisher community.

The fisher community expressed serious concern about purse-seining and trawling in their village, major causes for resource depletion. They

Participants interacting with the fisher community in Chinna Neelankarai, Chennai.

said purse-seining should be banned in Puduchery, as had been done in Tamil Nadu.

The fishers were aware of the CCRF and its guidelines. They followed rules and regulations on boat registration and display of the registration number. They said they adhered to safety requirements on boat maintenance, ascertaining weather conditions before fishing trips, carrying enough drinking water, food, extra fuel, tools, rope, anchor, torch light, sails, etc.

The fishers said the president of their village committee was authorized to deal with conflicts. They felt that rules and regulations ought to be adapted to local conditions. They wanted better communication facilities and life saving equipment. They also wanted short-term training courses on engine maintenance and sea safety.

Course moves to CIFE, Mumbai

The CIFE part of the course began on 20 June in Mumbai. Dr Latha Shenoy, senior scientist and course co-coordinator, welcomed the participants and introduced faculty and participants to one another.

Director Dilip Kumar said that while fisheries is a state subject in India, the central government has set up a strong R & D infrastructure, through eight institutions covering marine and inland fisheries and aquaculture. They function under the aegis of the Indian Council of Agriculture Research. CIFE is the only institute that encompasses all three areas.

Dr Kumar said that better links were needed between R & D and the field. The fruits of research ought to reach fishers more effectively, and fisher problems addressed better by research interventions. He hoped that the course trainees would interact with CIFE faculty on all fisheries matters.

Dr Yadava said that promoting the CCRF was a major capacity-building activity of the BOBP-IGO. About the training course, he said its three modules related to a historical overview of fisheries management; lectures on various aspects of the Code plus field visits and interaction with fishers; and group discussion and course evaluation.

Dr Dilip Kumar began the pedagogy session of the course with a presentation on the CIFE. He described the institution's achievements and its vision of becoming a global player for specialized HRD in fisheries. Discussing "Co-management of marine fisheries resources" Dr P S Ananthan described the different co-management regimes, with examples from BOBP-IGO member-countries as well as Japan.

Dr R S Biradar explained "Cost effective approaches for collection, compilation and dissemination of fisheries information". He said that while techno-economic and biological data on fisheries is essential, the nature of fisheries resources makes data collection through a census difficult. He discussed the scope and methodology of sampling processes to collect data, and stressed the importance of training in reliable fishery statistics.

In his lecture on "Integration of fisheries into coastal area management", Dr C S Purshothaman said that coastal zone management includes conflict management among stakeholders. Stakeholder consultations are therefore essential. He referred to the Indian Supreme Court's intervention on coastal aquaculture and the success of integrated coastal zone management practices in Kung Krabaen Bay, eastern Thailand.

Dr Latha Shenoy discussed adaptation of the CCRF to the grassroots. She said that since the Code is voluntary, it requires participation by all stakeholders. Since it is global, it has to be modified for adaptation to local conditions. She discussed the relative merits of different ways to disseminate the Code.

On 21 June 2008, course trainees met 30 members of the Versova Fisheries Co-operative Society at Versova fishing village, which is located close to CIFE on a creek. More than 380 mechanized vessels (ranging from 5m to 15.5 m) operate from the village, which has four fisheries cooperative societies.

Members of the Cooperative complained about discharge of untreated city sewage into the sea and destruction of mangroves for development. They said they follow government regulations on matters like vessel registration, mesh size and fishing bans; but such regulations are often inappropriate and should be modified.

About controlling fishing effort, the members said the government should follow the rule 'one fisher one boat'; often it grants licenses to rich boat owners who already have a boat. The members described lack of alternative livelihoods as a major problem. Better education and training would give them more options and reduce pressure on resources.

Group discussion

Group discussion followed the field visit, with the course trainees divided into four groups. Each group included a member from each country. Topics identified for group discussions:

- Taking CCRF to the grassroots;
- Role of stakeholders and modalities/ mechanisms of their participation in implementation of the Code;
- Alignment of policies and programmes to meet the requirements of implementation of CCRF;
- Adaptation of the CCRF to meet the local requirement.

The groups presented their findings during an interactive session on the morning of 23 June in which CIFE faculty participated. They also discussed policy issues.

At the concluding session, Dr Dilip Kumar hoped the course would benefit participants and their countries in implementing the Code at the grassroots level. He urged participants to put their learning to good use and promote sustainable fisheries. Dr Latha Shenoy thanked the BOBP-IGO for choosing CIFE as partner and said the course was an enriching experience. The trainees returned to Chennai on 23 June 2008.

Final session of the course in Chennai, 24 June 2008

The session began with the course trainees sharing their experiences of the field visits and course work at Chinna Neelankarai, Puducherry and Mumbai. They said the field visits gave them a better understanding of ground realities and of the views and roles of stakeholders in resource management.

A second group discussion ensued, with the groups this time arranged by country. They assessed implementation of the Code in their respective countries and how it could be adapted to meet local requirements. The four focus areas were the same as in the earlier group discussion.

Participants visiting a fish landing site in Tamil Nadu, India.

On the basis of discussions carried out for almost two full days, a representative from each country made a presentation on 27 June.

Major observations are summarized below:

- A wide knowledge gap exists among stakeholders about responsible fishing practices and the Code;
- Participation of other stakeholders in fisheries management is limited but gradually increasing;
- There is a communication gap between the government including R & D institutes and other stakeholders;
- The Code is more acceptable and easier to understand when translated into local languages or presented through posters; and
- Fishers are concerned about resource depletion and are eager to play a responsible role.

Some important suggestions that emerged from the group discussions:

- For effective dissemination of the Code, education and training are important tools.
- Mass media like TV and radio can be significant channels of dissemination. Since many fishers are familiar with mobile phones, Short Message Service (SMS) could be used as a delivery tool. Messages could also be disseminated through prayer services in places of worship.
- Alternative income-generation activities and vocational skills should be popularized among fishers.

Concluding ceremony

The concluding ceremony of the training course was held in the library hall of the BOBP-IGO Secretariat on 27 June 2008. Certificates were presented to participants.

Dr Yadava said the regional training course had been an enriching experience for the BOBP-IGO. The group discussions, presentations, and course evaluation by the participants would help the BOBP-IGO fine-tune future courses. They would also help the IGO's strategies for member-countries to adapt and implement the Code.

Dr Yadava asked the trainees to cultivate relationships formed during the course. They should continue to communicate with each other and with the BOBP-IGO, so that a fisheries network was established in the region. The trainees thanked the BOBP-IGO and CIFE, Mumbai, for the excellent conduct of the course and the warm hospitality. They assured the IGO that they would use the knowledge acquired during the course to promote and strengthen the CCRF in their respective countries.

Regional Consultation on Management Plan for Shark Fisheries

The Regional Consultation on Preparation of a Management Plan for Shark Fisheries, held in Beruwala, Sri Lanka, on 24-26 March 2008, was an outcome of a suggestion made at the second meeting of the BOBP-IGO's Technical Advisory Committee (Chennai, February 2007) and endorsed at the third meeting of the Governing Council (Malé, Maldives, May 2007).

Fifteen delegates from India, Maldives and Sri Lanka took part in the consultation. Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources (MoFAR), Sri Lanka, chaired the consultation.

Welcoming the delegates, Dr Yugraj Singh Yadava, Director of the BOBP-IGO, discussed the critical state of the global fishery. The FAO's report for 2006 showed that global capture fish production had reached a plateau, with most fish stocks being highly exploited. The Bay of Bengal (BoB) apparently is still the least exploited, but this phenomenon may reflect insufficient reporting rather than untapped potential. It is disturbing that small-sized fishes are being exploited more and more. Result: lower catch per unit effort and low fisher incomes.

Dr Yadava said that sharks have been an age-old fishery in India, Maldives as well as Sri Lanka, and shark landings are a source of livelihoods for many. Every part of shark has an economic value. However, shark stocks are now under threat; many species of sharks figure in the IUCN Red List. It is essential that negative impacts on shark populations are addressed urgently and a management plan formulated. He hoped that the present consultation would debate the subject and enable a road map for management plan on shark fisheries.

Mr Indra Ranasinghe, Director General (Development), MoFAR, Sri Lanka, said that reliable information was needed for a management plan, which in turn was needed to create awareness and education among stakeholders. He urged co-operation among member-countries in management, also periodic review and revision of management effort.

Mr Piyasena said that for centuries, artisanal fishers of Sri Lanka had harvested sharks as a non-targeted fishery. In recent decades, modern technology and access to distant markets had increased shark fishing effort and landings. The current view was that directed shark catches and certain multi-species fisheries in which shark catches constituted a significant by-catch should be better managed.

Mr Piyasena pointed out that member-countries of the BOBP-IGO, including Sri Lanka, were yet to develop a national plan of action on the basis of the International Plan of Action for Conservation and Management of Sharks (IPOA-Sharks) formulated by the FAO within the framework of the Code of Conduct for Responsible Fisheries (CCRF). He hoped the present consultation, a timely initiative, would lead eventually to national plans for shark management.

Technical Session

Dr E Vivekanandan, Principal Scientist, Central Marine Fisheries Research Institute, Kochi, India, made the first presentation on the "Status of Shark Fishery in Indian Exclusive Economic Zone (EEZ)". He said that of the 47 species of sharks that occur in the Indian seas, six species constitute a major fishery. Some 15-20 000 fishers engage exclusively in shark fishing. Average annual shark landings (1985-2006) amounted to 36 021 tonnes.

Regional Consultation on
Preparation of Management Plan for Shark Fisheries
Beruwala, Sri Lanka, 24-26 March 2008

Participants at the Regional Consultation.

Gantt chart for proposed activities to support preparation of a management plan for shark fisheries.

Sl. No.	Management aspects	2008					
		May	June	July	August	September	October
1.0	Preparation of comprehensive status paper on shark fisheries	◁	—	▷			
2.0	Stakeholder consultation		◁	—	▷		
3.0	Setting up the data collection mechanism			◁	▷		
4.0	Setting up of National Task Force	◁	▷				
5.0	Setting up of a 'Shark Portal/ Website'				◁	—	▷
6.0	Preparation of 'awareness material'				◁	—	▷
7.0	Indigenous traditional knowledge – documentation of a case study		◁	—	—	—	▷

He said that in the last few years, the fishery was shifting oceanward from the coast. Trawls, gillnets and hooks and lines accounted for about 95 percent of the shark landings. Potential yield of sharks in the continental shelf of the Indian EEZ had been estimated at 45 064 tonnes, and that of pelagic sharks beyond the continental shelf at 26 200 tonnes.

Dr Vivekanadan said that slow growth and late maturation – typical characteristics of the shark species – made them highly vulnerable to overfishing. During 1998-2005, an annual average of 853.7 tonnes of shark products valued at US $ 5.9 million were exported. Four species of sharks, *Carcharhinus hemiodon*, *Glyphis gangeticus*, *G. glyphis* and *Rhiniodon typus* are protected by law. Measures were needed to sustain the stock of sharks without affecting the livelihoods of fishers.

Ms Mariyam Saleem, Reef Ecologist, Ministry of Fisheries, Agriculture and Marine Resources (MoFAMR), Government of Maldives, said that the shark fishery in her country grew after exports began in the late 1970s, fuelling demand for high-valued shark fins, salted shark meat and shark liver oil from gulper sharks. Three types of shark fishery are carried out in the Maldives – the reef shark fishery, oceanic shark fishery and the deep water gulper shark fishery. Stocks, particularly of reef and oceanic shark fishery, have been depleted by heavy exploitation. Recovery of the stocks is not easy for species with the biological attributes of sharks.

Ms Saleem said that several conflicts had arisen over the years between shark fishermen on the one hand, and the tourism sector and the tuna fishing industry on the other. A 10-year moratorium had been imposed in 1998 on shark fishing inside and within 12 miles from the rim of seven atolls in the Maldives. This was meant to address the conflict between shark fishermen and the tourism sector. Additionally, to address conflicts between the shark and tuna fishermen, shark fishing had been banned from two locations in the south of Maldives, which are considered good fishing areas by tuna fishermen.

Ms Saleem said a 2003 survey showed that shark fishing was carried out in 22 islands (the figure has since fallen to 11) by 132 fishing vessels and 528 fishermen in 2003. Annual shark exports have fallen in value from MRf 15 to 20 million in the 1990s to below MRf 10 million now, said Ms Saleem.

Ms Saleem said that on the basis of diminishing stocks and FAO's call for shark protection, experts have recommended a ban on export of all products from reef and oceanic sharks in the Maldives, after a grace period of two years. She highlighted measures to mitigate the impact of such a ban on the livelihoods of shark fishermen in the Maldives.

Dr Champa Amarasiri, Director, Research and Development, National Aquatic Resources Research and Development Agency (NARA), Sri Lanka, made a presentation on shark fisheries in Sri Lanka's EEZ. She said that during the past two decades fishing activities had got extended to the edge of the 200 mile EEZ and even beyond.

The Regional Consultation in progress.

Shark capture in Sri Lanka is about four or five decades old. A majority of the shark catch is a by-catch from tuna long line and gill net boats. Sharks are targeted directly by long line and deep water fisheries, but this effort is rather insignificant, Dr Amarasiri said.

Shark catches have been decreasing rapidly during the past 10 years because of restrictions in fishing areas, also because more and more fishers are moving towards tuna longline fisheries. Catches comprise mainly silky sharks and another 12 species.

Dr Amarasiri said that the estimated total catch of sharks was 2 101 tonnes in 2006 and the total number of people engaged in this fishery were around 15 000. There is no management plan for shark fisheries in Sri Lanka. However, the Fisheries Act and other environmentally related legislations of Sri Lanka have provisions to conserve and manage shark fisheries in the country.

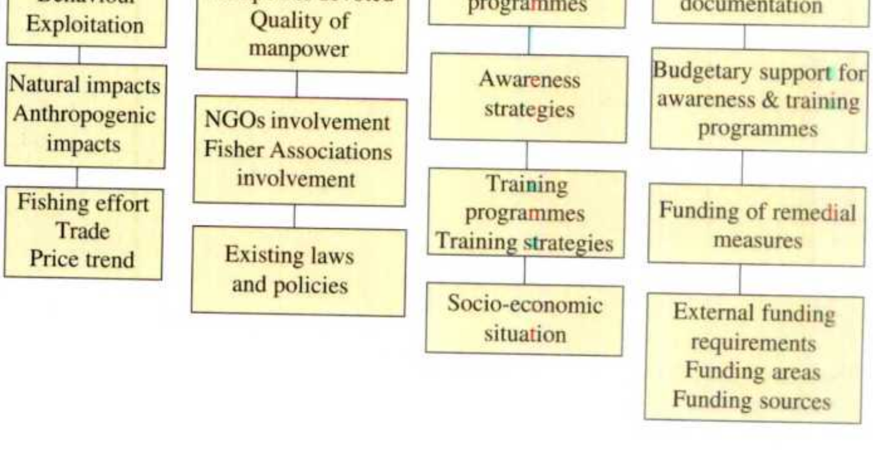
Following the country presentations, Dr Y S Yadava discussed an action plan to formulate a management plan for shark fisheries. He referred to the peculiar characteristics of sharks – they are distributed in coastal waters and the deep seas; some stocks are migratory and shared among the three coastal states; the stocks are exploited by both targeted and non-targeted fishery; knowledge on their taxonomy, biology, breeding and distribution is poor. A sound monitoring and control mechanism for shark in a given fishing area is therefore difficult.

Dr Yadava discussed the proposed 'Guidelines for Preparation of Management Plan for Shark Fisheries' that had been drawn up by the Secretariat in accordance with the CCRF and the IPOA-Sharks. The Guidelines include a "Framework for a Management Plan on Sharks," which has four main heads relating to information, institutional arrangements, stakeholders, and finance and funding.

On the basis of the framework for a management plan, an indicative discussion map with six log-tables was given to the delegates. The log tables were headed as follows:

- ***Log 1:*** Status of shark fishery in the BoB (comprising knowledge of fish stocks; of breeding behavior; of breeding grounds; of fishery and fishing effort; etc.)
- ***Log 2:*** Natural and anthropogenic impacts (relating to existing quantitative and qualitative natural and anthropogenic impacts; possible threats; suggested remedial measures and agencies that could carry out these measures; and anticipated cost of these measures).
- ***Log 3:*** Socio-economic analysis – institutional arrangements. (relating to R & D institutions and their spheres of coverage; ongoing schemes; budgetary allocation; manpower involved in R & D; NGOs active in shark fisheries management programmes; fisher associations; existing legislative and policy support.)
- ***Log 4:*** Socio-economic analysis – awareness creation and training (comprising methods used and materials developed; extent and scope of awareness drive; feedback on awareness drive; possible future approaches; budgetary allocation on awareness drive; the role of NGOs; quality of extension and field staff; training programmes organized.)
- ***Log 5:*** Socio-economic analysis – livelihoods and trade (comprising such points as the socio-economic status of shark fishers; the structure of the shark fisheries market, its volume and scope, price trends, ways to reduce fishing, alternative livelihood options, etc.)
- ***Log 6:*** Economic analysis – funding requirements and provisions (relating to possible additional funding needed to carry out activities; external funding received so far; utilization rate of external funding; areas where additional funding could be used.)

Delegates discussed issues for their country among themselves and


Framework for Management Plan on Sharks
Review of information
Shark stocks
Shark biology
Behaviour
Exploitation
Natural impacts
Anthropogenic impacts
Fishing effort
Trade
Price trend
Review of institutional arrangements
Organisations involved
Manpower devoted
Quality of manpower
NGOs involvement
Fisher Associations involvement
Existing laws and policies
Review of stakeholders
Level of awareness
Awareness programmes
Awareness strategies
Training programmes
Training strategies
Socio-economic situation
Review of finance and funding
Budgetary support for research/ documentation
Budgetary support for awareness & training programmes
Funding of remedial measures
External funding requirements
Funding areas
Funding sources

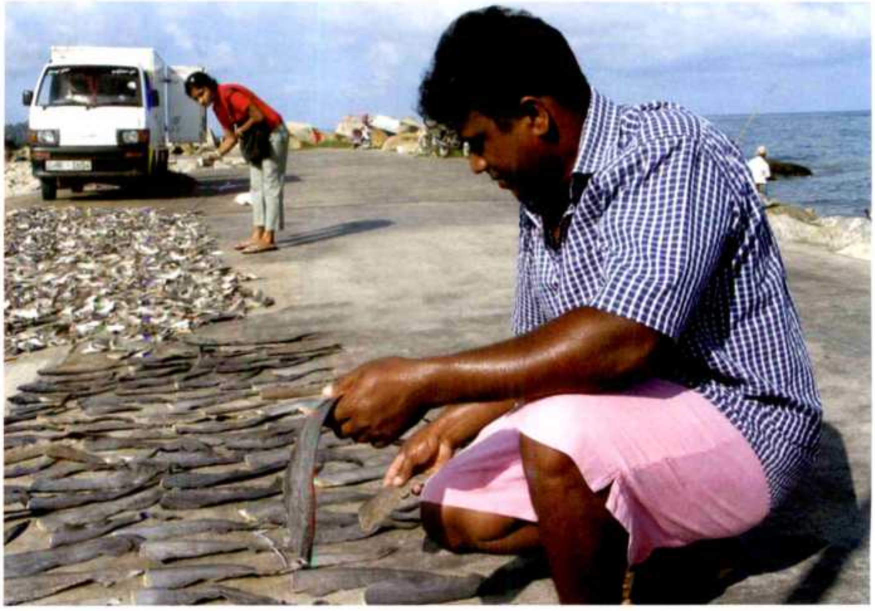
pooled their knowledge to analyze the shark fishery in terms of the information sought in the log tables. They identified gaps in information and the future course of action.

Dr Vivekanandan presented the log tables for India. He emphasized the need for more taxonomic work on the sharks; revalidation of the shark stocks with additional scientific inputs; data on species-wise effort; biological investigations covering a larger number of shark species, especially those inhabiting the deep seas; natural and anthropogenic impacts on shark fisheries.

He said that India has 5-6 fisher groups that carry out targeted fishing for sharks. Awareness drives could be first attempted for such focused groups with the help of dedicated NGOs working in the area. A task force on the pattern of 'Project Tiger' may be considered to manage shark fisheries. Indigenous traditional knowledge could be documented.

Presenting the log tables for Sri Lanka, Dr Amarasiri referred to the dearth of data on oceanic sharks. As for reef-associated sharks and gulper sharks, systematic knowledge on biology, breeding and related attributes is lacking. There is no significant targeted fishing for sharks in Sri Lanka, but non-targeted fishing, especially that associated with tuna long lining and gill netting, can be a problem for shark stocks. There are no on-going research programmes on shark fisheries *per se*, but they are covered in a limited manner under investigations on 'larger pelagics' carried out by NARA.

Mr Mohamed Shainee, Assistant Director-General, MoFAMR, described the shark fishery in the Maldives as unique. At present, only 11 islands in the country engage in it. Information on shark fishing is limited and species-wise data is lacking. Production figures are computed from exports – which label sharks as a single group. Maldives had prepared a status paper on shark fisheries in 2003, which was updated in 2006. But further study is required on trade aspects of shark fisheries. Awareness is important, so is traditional management knowledge. A website on shark fisheries could be useful for information dissemination.



Constitution of Technical Committee

The Regional Consultation agreed to constitute a Technical Committee in each country to initiate action on the requirements identified at the Consultation.

Proposed Action Plan

On the basis of the deliberations, the Consultation agreed on the following set of activities for implementation. Support would be provided by the BOBP-IGO as per an agreed action plan.

(i) A comprehensive status paper on shark fisheries resources, including a research bibliography.

(ii) A stakeholder consultation on management of shark fisheries in each of the three countries. The Consultation will also discuss and identify alternative livelihoods.

(iii) Setting up of a data collection, collation and compilation mechanism on shark fisheries, especially species-wise data, which would aid in the successful implementation of the management plan.

(iv) Setting up of a 'National Task Force' on shark fisheries management.

(v) Setting up of a shark portal or website for the Bay of Bengal region.

(vi) Documentation of indigenous traditional knowledge for management of shark fisheries.

(vi) Preparation of awareness materials on conservation and sustainable exploitation of shark fisheries.

To carry out these activities in a systematic time frame, a Gantt chart covering the period May - October, 2008 was agreed to by the Regional Consultation (see page 48). It was also decided that the next meeting would be held in the Maldives during the last quarter of 2008, subject to the approval of the Government of Maldives.

In conclusion, Mr Piyasena said the Consultation had enabled a good opportunity to initiate preparation of a management plan for sharks. He thanked the BOBP-IGO Secretariat and the delegates, also Maldives for agreeing to host the next meeting.

A Regional Consultation on Safety at Sea for Small-Scale Fisheries

A Regional Consultation will be held in Chennai in July, 2008 to review the progress of work under the FAO Global Project on "Safety at Sea for Small-scale Fisheries". The Regional Consultation will report on the progress of project activities in south Asia, share information on global initiatives, discuss the status of safety at sea in BOBP-IGO member-countries and present draft technical safety guidelines for fishing vessels under 24 m in length.

A Bi-national (India and Sri Lanka) Workshop on Safety at Sea will be organized for India and Sri Lanka along with the Regional Consultation in Chennai, India. Participants will include fisheries officials, boatbuilders, representatives of national agencies concerned with fisheries training and education and with fishing vessel regulations, plus representatives from the FAO, the IMO, NIOSH (the National Institute for Occupational Safety and Health, USA) and the BOBP-IGO.

The idea of the IMO Project is to introduce sound construction guidelines for small fishing vessels in India and Sri Lanka, following the December 2004 tsunami which sparked a boom in construction of fishing vessels – many of which were of low standard and built hurriedly in makeshift boatyards by people with little experience in FRP boat construction. The workshop is being organised by the BOBP-IGO in association with FAO and IMO.

APFIC Regional Consultative Forum Meeting (6-9 August 2008)

The Asia Pacific Fishery Commission (APFIC) will organize the second Regional Consultative Forum Meeting (RCFM) from 6 to 10 August 2008 in Manado, North Sulawesi, Indonesia. The RCFM will provide a forum to synthesize, analyze and agree on actions needed to "Adapt to emerging challenges – promoting effective arrangements for managing fisheries and aquaculture in the Asia-Pacific Region". More specifically, the RCFM will review policy recommendations and action plans to address two key issues identified by APFIC: (a) certification of fisheries and aquaculture, and (b) fisheries overcapacity and IUU fishing. The RCFM will also explore two new key areas for future work – the ecosystem approach to the implementation of the Code of Conduct for Responsible Fisheries (CCRF) and market linkages, trade and finance – reducing vulnerability and strengthening livelihoods.

Thirtieth Session of the Asia-Pacific Fishery Commission (11-13 August, 2009)

The Thirtieth Session of APFIC will be held in Manado, Indonesia from 11-13 August 2008. The session is being convened under the provision of Article XIV of the FAO constitution and will discuss a range of topics such as (i) status and potential of fisheries and aquaculture in Asia-Pacific; (ii) APFIC's strategy and promotion of regional initiatives for more effective fisheries management; (iii) regional themes such as certification in fisheries and aquaculture, capacity management, combating IUU fishing, emerging issues in fisheries, and implementation of the CCRF.

National Workshop on Monitoring, Control and Surveillance

A National Workshop on MCS will be held in Chennai on 1-2 December, 2008. The workshop will be organized jointly by the Government of India and the BOBP-IGO. It is a sequel to a Regional Workshop on MCS held in Chittagong, Bangladesh, in January 2008, which recommended that member-countries formulate action plans for successful implementation of MCS and for strengthening national agencies responsible for MCS. Accordingly, the workshop will review and analyse marine fisheries management programmes in India as well as procedures for licensing and registration of fishing vessels. It will assess the capacity for MCS, identify institutional requirements and prepare a plan of action.

Expert Consultation on "Best Practices for Safety at Sea in Fisheries"

An Expert Consultation will be held at the FAO headquarters in Rome from 10 to 13 December, 2008. It is being organized by the FAO in co-operation with the BOBP-IGO. Participants will be fishers, experts on fishing vessel safety, and resource persons from member-countries of the FAO. The consultation is expected to produce a draft outline for guidelines on best practices for safety at sea in fisheries, plus recommendations on the special needs of developing countries. The guidelines have to be approved by the FAO Committee on Fisheries at its next meeting in early 2009. The draft outline will also identify the next steps after the Consultation.

Calendar on Safety at Sea

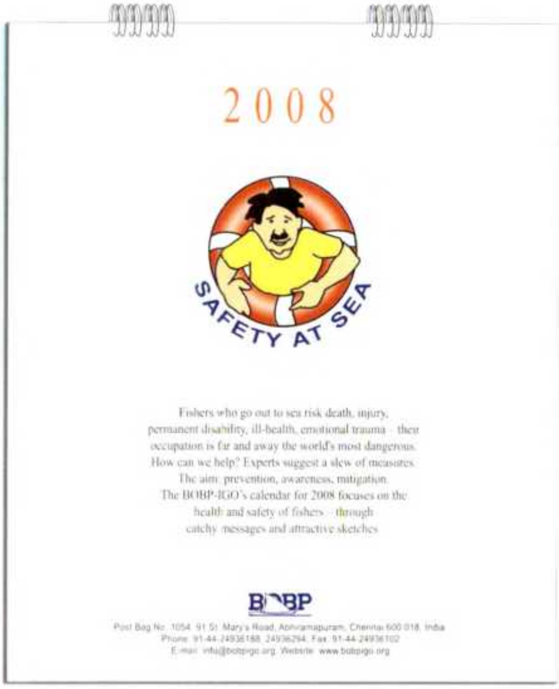
What are fishers up against when they venture out to sea? They dream of a jackpot harvest but may experience a nightmare – injury, permanent disability, physical, mental and emotional trauma, death. But they can prevent or minimize disaster by following the right precautions.

BOBP-IGO's 2008 calendar offers a slew of straightforward messages for fishers everywhere. Plan your fishing trip. Carry your first-aid kit. Use navigation equipment and spares. Learn to signal that you are in trouble. Use protective gear. Conserve fresh water. Keep a lifebuoy. Make sure of course that the fishing boat is safe, has been built right. One useful non-fisheries tip, particularly aimed at migratory fishing communities: Use condoms!

The charm of the calendar lies in the illustrations: suggestive sketches rather than photographs, which show outlines of face and figure, and a breezy zig-zag line to indicate a wave. Says BOBP-IGO artist S Jayaraj, who received queries from even professional artists about his technique: "I did a line drawing of every situation, then used Photoshop to fill in with colour – as many as 256 colours of different tones and gradations."

"Useful calendar and very charming" was one reaction to the calendar – it is being distributed to fishers of the region at workshops and community meetings.

Research preceded the calendar, so did trial-and-error with various sketch options. Ask for the calendar if you don't have it – we have a few copies left.



Fishers who go out to sea risk death, injury, permanent disability, ill-health, emotional trauma – their occupation is far and away the world's most dangerous. How can we help? Experts suggest a slew of measures. The aim: prevention, awareness, mitigation. The BOBP-IGO's calendar for 2008 focuses on the health and safety of fishers – through catchy messages and attractive sketches

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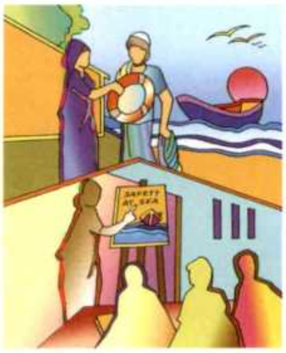

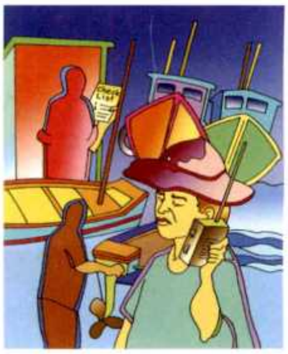

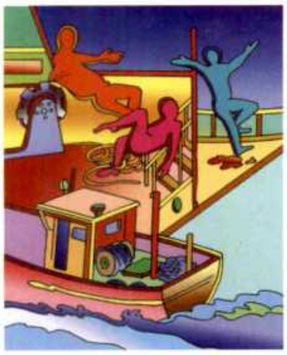

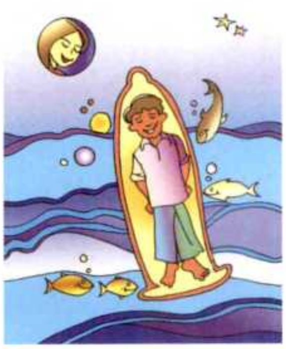

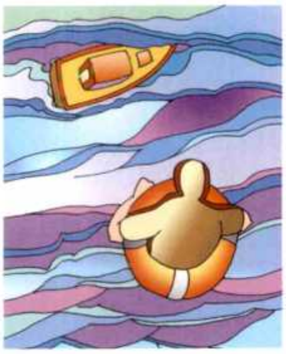

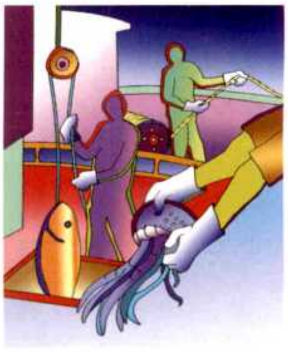

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation(BOBP-IGO). The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

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Integrating Safety at Sea with Fisheries Management

Bay of Bengal News examines the many dimensions of safety at sea, with facts, anecdotes and analyses, plus reports of consultations in Chennai and Rome. The main message: Governments should strengthen MCS, as part of their fisheries management gime. Expected outcomes: more reliable ata, sounder laws, more knowledgeable fishers, firmer enforcement – and fewer accidents at sea.

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Integrating Safety at Sea with Fisheries Management

Driven by need and emboldened by technology, small-scale fishers are risking their lives by going farther out to sea. Fisheries management – through a sound MCS (monitoring, control and surveillance) policy – is essential to strengthen fisher safety. MCS will control fishing effort, upgrade skills and knowledge, strengthen data, facilitate search and rescue, improve discipline.

Late in October 2007, Perumal[1], 46, and his fishing mate Selvaraj, 42 (Cuddalore district, Tamil Nadu) went fishing one morning. They were on their new beauty, a 27 ft FRP boat driven by a 10 hp engine. Discarded on the beach lay their older vessel, a five-log catamaran.

Ignoring a weather warning, Perumal and Selvaraj sought the rich haul of deeper waters. So did fellow-fishers. Some 40 nautical miles from the coast, they were buffeted by stormy winds. The boat capsized. Perumal and Selvaraj clung for dear life to two plastic cans meant for water and spare diesel. They were rescued 20 hours later by a passing ship: battered, sick, shaken, sans boat.

Around the same time: In neighbouring Sri Lanka, Vincent, 36, and a crew of four set sail from Negombo fishing harbor on "Shining Star" (a 15 meter FRP fishing vessel) on a three-week tuna-hunting voyage. They too made light of weather warnings. They made for the high seas between Nicobar and Sumatra islands, fairly well-equipped – VHF and SSB radio sets, some simple life-saving gadgets, food.

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[1] ***Names of persons and places changed to protect identity.***

But nature played spoiler: depression, storm, equipment breakdown. Result: A little vessel let loose in the vast ocean expanse for almost a month. Happy ending, however. Rescue by the Indian Coast Guard.

Perumal and Selvaraj spent a week in hospital, Vincent and crew spent a month. But they were lucky to survive. Not so, many other fishers from India and Sri Lanka.

Such incidents in the waters of the Bay of Bengal raise several questions.

Are vessels like Perumal's and Vincent's meant (either built or certified) for deeper waters? Are they equipped with communication and life saving equipment? Is the crew trained in navigation, emergency repair and life saving? Do fisheries management policies incorporate safety concerns?

Let's look at some of these issues.

In many developing countries, fisheries is a major economic activity. It means food, livelihood, nutritional security, foreign exchange through export, it's a growth trigger in coastal areas. No wonder governments adopt growth-oriented policies. But the safety of fishers doesn't figure in their calculations. Many policies have actually aggravated the risk profile of fishers.

Growth oriented policy-making was fine when resources were aplenty and fishing effort was limited. Not the case today – the story is one of dwindling stocks and ever-expanding capacity. Further, technology has enabled even small-scale fishers to move off-shore or fish longer. And many imperatives of sound fishing have been neglected – sound boatbuilding practices, use of communication and personal protection equipment, training in navigation, engine maintenance and repair. Result: Marine fisheries development has got lopsided. Risks have gone up manifold. For Perumal and Vincent, a day lived is a day of risks survived.

The solution? Devise fisheries management policies that strengthen safety. In a word: MCS or monitoring, control and surveillance. The Chittagong Resolution of 2008 passed by the BOBP-IGO's Regional Consultation on MCS urged member-countries to integrate MCS into fisheries policy and regulation, and make it a part of the management framework. It also urged education, training and awareness programmes as a part of the process (***Bay of Bengal News,*** Vol IV, Nos. 15-16, March –June 2008).

An FAO 2001 study revealed that MCS capability in the region ranged from 41 percent (Bangladesh) to 62 percent (Maldives). The study also concluded that different management paradigms impacted differently on fisher safety.

Fishing management regimes and their impact on fishing safety

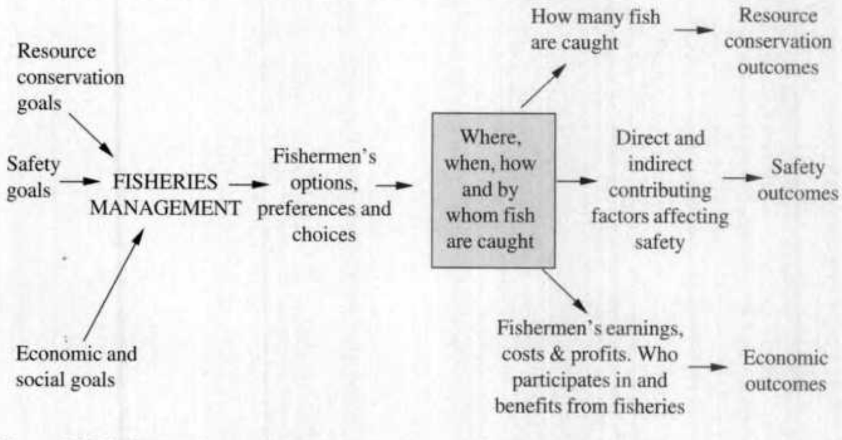
In 2008, the FAO and the NIOSH were partners in an international effort to document the relationship between fisheries management and fishing safety and also provide practical guidelines for fisheries managers and safety professionals on how they could help to make commercial fishing safer.

The study provided an expanded perspective of fisheries management (see the schematic diagram below). It showed that fisheries management policies affect fishermen's options, preferences and choices, and may also affect the human, equipment, and environmental factors that impact on safety. The primary goals of fisheries management may be resource conservation, economic growth and social amelioration; but fisheries managers should be aware of the indirect effect of management on safety.

The study observed that fisheries management is a complex challenge. Managers must attempt to balance multiple objectives with limited resources. The study recommended that fisheries managers:

- should be aware that the way fisheries are managed affects safety;
- should consider safety an explicit goal of fisheries management;
- should build up mechanisms for close collaboration and cooperation with the authorities responsible for safety; and
- should engage safety professionals to ensure competent safety records.

Fisheries Management: An Expanded Perspective


How many fish are caught
Resource conservation outcomes
Resource conservation goals
Safety goals
FISHERIES MANAGEMENT
Fishermen's options, preferences and choices
Where, when, how and by whom fish are caught
Direct and indirect contributing factors affecting safety
Safety outcomes
Economic and social goals
Fishermen's earnings, costs & profits. Who participates in and benefits from fisheries
Economic outcomes

Source: FAO Fisheries and Aquaculture Report No. 888.

All the four member-countries of the BOBP-IGO have fairly large fishing fleets (ranging from 4 356 fishing vessels in the Maldives to some 2 40 000 in India) and large small-scale fisher populations. Management isn't simple. An open-access fisheries regime makes it tough and complex.

How can safety at sea be integrated with fisheries management?

Safety concerns over fishing at sea have emerged in an organized way only recently, thanks to the United Nations. Pioneering work on small-scale fishing vessels (FAO and IMO); worldwide acceptance of labour rights (ILO); the initiatives of regional fisheries bodies such as the BOBP-IGO (and its forerunner the BOBP). All these have raised the profile of safety issues, led to the formulation of standards and guidelines, and spurred debate on action to reduce fishery-related accidents.

Developed countries such as the United States have set up systems for time-series data on the causes of fishing-related accidents (in Alaska in particular). Fishing has consequently become a much safer occupation in the U.S. Data in these countries shows a fall in injuries and fatalities, but there's scope for further improvement. In developing countries, however, reporting on accidents at sea is poor, so also understanding on the subject. A mechanism for monitoring and recording fishing-related accidents is essential.

A sound MCS would:

- enable regulation of access to the fishery resource through proper licensing and registration of fishing vessels;
- control fishing effort, if required;
- provide zoning for different categories of fishing vessels depending on their size, capacity and endurance to fish in different depths;
- make possible closed fishing areas and closed fishing seasons;
- ensure maintenance of log books and movement registers;
- coordinate and streamline search and rescue operations in times of distress; and
- in essence, bring much-needed discipline into fisheries.

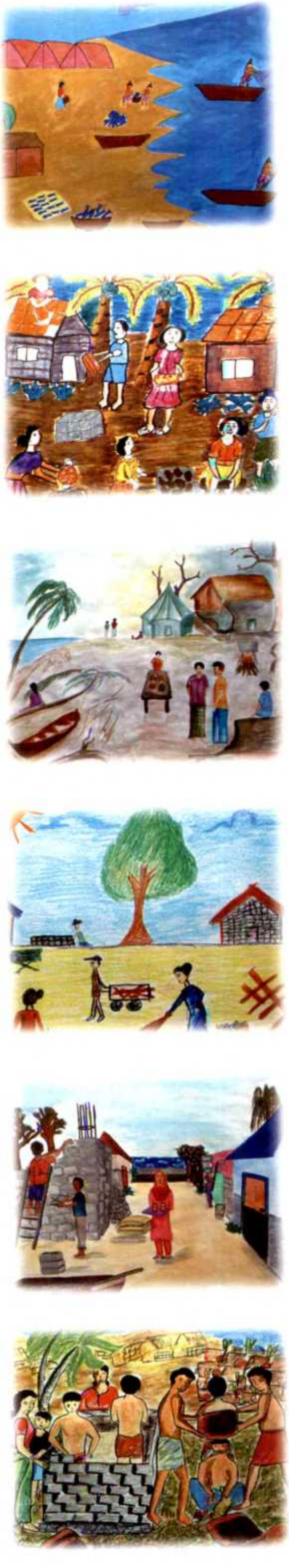
Safety-at-sea is a multidimensional issue. It should therefore be regarded as integral to fisheries management. It shouldn't be bundled together with welfare programmes for fishers, in the form of compensation after accidents.

Some other points:

- Adopt a precautionary approach to safety, by ascertaining the causes for accidents, then deciding on interventions;
- Raise awareness, bridge gaps in knowledge and skills, involve fisher families in creating a 'safety culture' in the day-to-day life of fishers;
- Promote asset- building among small-scale fishers;
- Promote and strengthen insurance practices in fisheries (both life insurance and asset insurance – assets such as craft or gear); and
- Discourage risk-taking behaviour by fishers.

Fishers seem to revel in risk and adventure – an attitude that imperils personal safety. Perumal and Vincent are examples. Integrating safety with fisheries management is a challenge complex but not insurmountable. What should policy-makers strive for? Higher fish production alone? Or a sound, sustainable and stable sector, with reasonably safe and secure fisherfolk?

– Y S Yadava



Paintings by school children in India, Maldives and Sri Lanka depicting post-tsunami reconstruction.

Conservation and development of fish genetic resources—Mission of the National Bureau of Fish Genetic Resources

The National Bureau of Fish Genetic Resources (NBFGR) based in Lucknow, is India's premier organization devoted to conservation and sustainable development of fish genetic resources.

Set up in December 1983 in Allahabad and moved to Lucknow in 1994, the NBFGR taps cutting-edge technologies and mobilizes national co-operation to:

- collect, catalogue and document fish genetic resources;
- maintain and preserve fish genetic material to conserve endangered fish species;
- evaluate indigenous and exotic fish species; and
- ensure Intellectual Property Protection relating to fish genetic resources.

The infrastructure

The 52-hectare complex on which NBFGR stands (inaugurated by Prime Minister Atal Behari Vajpayee in June, 1999) houses laboratories; farm facilities (broodstock rearing ponds, nursery ponds, breeding ponds, a live fish gene bank, data banks); an Information Technology provider known as ARIS *(*Agriculture Research Information Service*)* cell which contains hardware, software and networking facilities and a Geographic Information System or GIS lab; an Intellectual Property Rights training cell; an extension and training cell; a fully automated library that provides electronic access to several databases and to top journals in agriculture, plant sciences, fisheries, aquaculture and ecology.

An International Centre for Fish DNA Barcoding was established in 2006. A microbiology lab was developed and equipped for disease diagnostics. An Aquaculture Research & Training Unit focuses on quality fish seed production technologies and on training both farmers and department personnel. It is presently being upgraded, with a special emphasis on catfish, carp and freshwater prawn.

Other infrastructure includes an aquarium, a hatchery complex and a fish museum, to be expanded into a National Fish Museum. Besides, a research unit of the NBFGR was set up in Cochin in 1994 at the Central Marine Fisheries Research Institute, Kochi.

NBFGR is run by a staff of 79 including 26 scientists, a research manager and 26 technical support personnel.

Director of the National Bureau of Fish Genetic Resources, Lucknow, Dr W. S. Lakra has implemented several innovative programmes in aquatic genetic resources conservation including DNA barcoding of fish and marine life and the concept of a 'State Fish'.

A graduate of Delhi University, with an MSc and PhD from H.N.B. Garhwal University, Dr Lakra has been principal scientist and head of the department of genetics and biotechnology at the Central Institute of Fisheries Education, Mumbai, where he helped initiate India's first master's and PhD programmes in fish genetics and biotechnology. He also helped establish a Centre of Fish Molecular Genetics and Biotechnology. He organized several HRD programmes in fish biotechnology and the first national conference on the subject in 2000.

Dr Lakra has authored or edited 20 books, published more than 120 research papers and guided several research students.

Widely traveled, he has visited Canada, Norway, France, Australia, China, Singapore, Bangladesh, Korea, Malaysia, Thailand and Taiwan. He has been an expert member of the international review team for the genetic improvement and biodiversity programme of the WorldFish Centre, Malaysia. He has made significant contributions in fish genetics, biodiversity conservation and aquaculture biotechnology through research, teaching, extension, research management and infrastructural development.

Dr Lakra has won several honours, including the M. S. Swaminathan Best Indian Fisheries Scientist Award. He is founder president of the Aquatic Biodiversity Conservation Society and regional chair of the Global Consortium of Barcoding of Life (CBOL).

The why and how of NBFGR

Before describing the achievements of the NBFGR, which is now about 26 years old, one first needs to clarify the scientific and development rationale of a knowledge-intensive, technology-intensive and research-intensive organization like the NBFGR, and its methodology.

Rationale: Fisheries and aquaculture are crucial for India's food production and food security. Fisheries and aquaculture also relate directly to poverty alleviation and economic uplift – since thousands of fisherfolk and farmers depend on fisheries for their livelihoods. Fisheries and fish products also feed the pharmaceutical industry and other industries.

But fish resources everywhere – not just in India and worldwide – seem to be dwindling and are under pressure. Some resources are in danger of extinction. Making fisheries sustainable demands better planning, sounder management strategies, and better knowledge of India's rich aquatic biodiversity.

A majority of the genetic resources for food still come from the wild, because of the low domestication level in fisheries, in contrast to animal farming and agriculture.

Threats to our aquatic biodiversity are many and varied – over-exploitation of resources, habitat alteration, construction of dams, introduction of non-native species etc.

Conservation and management of India's fish and aquatic resources call for holistic approaches to knowledge and to documentation, hence the relevance and role of the NBFGR.

Methodology

NBFGR carries out multi-disciplinary research, develops research tools and disseminates information – in biology, genetics, molecular biology, biotechnology, etc. It studies habitats and inventories the resources. It taps remote sensing and GIS applications. Result: databases that strengthen knowledge and provide insights on our fish and aquatic resources.

राष्ट्रीय मत्स्य आनुवंशिक संसाधन ब्यूरो
NATIONAL BUREAU OF FISH GENETIC RESOURCES
N.B.F.G.R

What are the achievements of NBFGR?

1. Development of databases

A database has been developed on India's fish diversity, comprising information on 2 245 indigenous and 291 exotic finfishes.

The database provides information on a) classifications,
b) nomenclature: scientific name, synonyms, local names in different regional languages, common name in English, c) distribution in India and abroad (global distribution),
d) habitat: coldwater, warmwater, brackishwater and marine,
e) commercial importance: food fishes, sports fishes, ornamental fishes, cultivable fishes, etc,
f) maximum and minimum size,
g) morphological features including key identification features like fin formula, h) status: endangered, vulnerable, threatened, rare, indeterminate (based on IUCN criteria), and i) images: studio photographs, diagrams and digital.

Every finfish has been given a distinctive five-digit code. The first three digits relate to the genus, the last two digits show the species. Thus each species has a unique code. All the information related to a particular species can be retrieved by this unique code.

The database is being updated for shellfishes. The present information covers 1 655 molluscan, 923 crustacean, 43 echinoderm and 350 species of marine ornamental fishes. Information has also been collected on marine shellfishes of India – prawns, lobsters, crabs, gastropods, bivalves, cephalopods, turtles, crocodiles, whales, dolphins, porpoises, sea cows, sponges, corals, sea cucumbers, sea urchins and seaweeds. Work is in progress to incorporate genetic information as an important component of the database. The work is also being extended beyond the taxonomic diversity of fishes.

Under a collaborative programme, 31 new fish species from the northeast and the Western Ghats have been identified and described. More unexplored regions are to be surveyed to describe germplasm resources in future. Attempts are being made to develop databases on a GIS format. Policy makers envisage a database that will provide integrated information concerning habitat, distribution and other available information.

Database: 'Fish Chromosome World'

A database named 'Fish Chromosome World' in digital interactive format has been published by NBGFR. It contains karyomorphological information on 126 finfish species from 34 families and nine orders. The fish species and its locality are classified, information is provided on the chromosome number, the chromosome formula, authors and references. Photographs of metaphase spreads and/or karyotypes of fish species are provided. The database can be accessed on NBFGR's official website **www.nbfgr.res.in**.

2. Genetic Characterization

DNA Barcoding of Indian fishes

With the help of sophisticated equipment acquired for genetic characterization (major facilities include an automated karytyper, a DNA sequencing and genotyping system), the NBFGR has initiated a comprehensive programme on DNA barcoding. This is a species identification programme – being developed for the first time in India – for all marine and freshwater fishes of India.

The work on DNA barcoding of Indian fishes was initiated in July 2005, at NBFGR, as the lead centre for the Indian region working group of FISH-BOL. An international training programme on "DNA Barcoding of Marine Life" was conducted at NBFGR from 16 to 21 April 2007. Trainees and resource personnel from Canada, Australia, Kenya, Tanzania and South Africa participated.

Under the DNA barcoding programme, comprehensive sample collections are being obtained. DNA barcodes were prepared for 742 sequences (DNA barcodes) of 244 species.

Genotyping and Genetic Diversity Analysis

The NBFGR identifies appropriate genetic markers which make possible the quantification of genetic variability at intra and inter-specific levels. Expertise has been developed for various classes of markers – cytogenetic, allozyme, DNA including RAPD, mtDNA, RFLP – and microsatellites. These markers are used to generate information and data on prioritized fish species to study inter-specific and intra-specific variation.

Species-specific diagnostic markers

Unambiguous description of a species is important for conservation. Molecular markers are invaluable tools to complement conventional tools in resolving taxonomic ambiguities. Species-specific diagnostic markers have been developed to detect hybridization and introgression in Indian major carp hatchery and wild populations. The markers included allozyme and mtDNA haplotypes.

NBFGR has a very strong cytogenetic data base for about 200 fish species and stocks within species which will help to resolve ambiguities between different species or varieties. This in turn will help plans for conservation strategies of endangered species and their utilization in fish breeding programmes.

NBFGR has characterized several fish species such as *Labeo rohita, Catla catla* and *Cirrhinus mrigala*; endangered mahseer species, including *Tor khudree, T. mussullah, T. tor, T. putitora, Schizothorax richardsonii*; and commercially important catfishes like *Clarias batrachus, Heteropnuestes fossilis,* etc. Variations have been reported for the first time between *Clarias batrachus* and exotic *C. gariepinus* using cytogenetic markers like C- and NOR banding.

Molecular markers in endangered and commercial fish species

At intra-specific levels, variations are assessed within and between populations. Such studies provide precise information on the stock structures of prioritized endangered and commercial fish species. This is vital for planning rehabilitation of endangered fishes and for genetic improvement of cultivable species.

Research on two important Indian major carps, *Labeo rohita* and *Catla catla,* indicates a substructure population for these two species. The study has identified genetic stocks of rohu and catla across its natural range of distribution in India using allozyme and microsatellite DNA markers.

Genotoxicity assays

An increasing number of genotoxic chemicals like pesticides and heavy metals are being released into the aquatic environment. These imperil not merely aquatic biodiversity but human health as well. The Bureau has developed strong skills for studying the genotoxic effect in fishes through a battery of test systems like the micronuclei test, the chromosome aberration test, the sister chromatid exchange (SCE) assay and the comet assay. Such studies not only help determine the safe level of genotoxicants in water bodies but also help remedial measures to conserve our rich aquatic biodiversity.

3. *In situ* conservation

The *in situ* conservation programmes of the NBFGR cover protected areas and fish sanctuaries, the traits of prioritized species, evaluation of the impact of exotic fishes on natural populations, development of assays for genotoxicity, etc.

Such conservation efforts cannot be meaningful without people's participation through mass awareness programmes. Local bodies and fishing communities must be sensitized about conservation programmes.

'State fish': A novel approach to fisheries conservation

Under this initiative, the Directorate of Fisheries of each Indian state was encouraged to adopt one fish species as a 'State Fish' on the lines of the National Animal/National Bird. So far, 15 states have responded to this initiative with 'State Fish' declarations. The idea is that conservation of these species will be researched and reviewed as a matter of priority, with technical help available from NBFGR. An operational farm in each state will be devoted to the 'State Fish' for developing a gene bank and broodstock and propagation protocol. Eventually, strategies can be developed for field level conservation programmes.

Life history traits of natural populations of prioritized fishes

Studies on life history traits of fish populations are essential for planning conservation and management of a species. Such studies have been scanty so far. Parameters like fecundity, size at first maturity, gonadosomatic index, age and growth, length-weight relationship, oocyte size frequency profile, food and feeding habits, etc. are crucial for examining any stock. Of the 587 freshwater species reported in India, more than 100 species have potential for culture. NBFGR is conducting studies to generate life history data of endangered and commercially important fishes in the North East and in the Western Ghats, to facilitate sustainable management and conservation.

Fish sanctuaries and protected areas

Very few sanctuaries for aquatic resources – necessary for *in-situ* conservation – exist today. Aquatic sanctuaries including marine protected areas would not only help conserve biodiversity but also rejuvenate fisheries.

Captive propagation of threatened fishes

Captive breeding programmes are a principal tool to compensate for declining fish populations, and supplement and enhance yields of wild fisheries. Culture, breeding and larval rearing technologies have been practiced for decades for major carps, but they do not exist for many other freshwater fish species with commercial potential.

At NBFGR, efforts to develop protocols of captive breeding and larval rearing for non-conventional species in collaboration with fish farmers have shown remarkable success. This may pave the way for commercializing the technology and transferring it to fish farmers, fish traders and fish entrepreneurs.

Community participation in conservation

India's northeast is a hot spot of freshwater biodiversity. The natural resources of northeast states harbour 267 fish species – approximately one third of India's freshwater fishes. It is essential to prevent unlimited exploitation of untapped wild germplasm resources and put in place a strategy for sustainable utilization of resources. NBFGR has undertaken a comprehensive project for development and conservation of fisheries in the northeast states with community participation.

4. *Ex situ* conservation and gene banking

Gene banking is a powerful *ex situ* conservation tool. NBFGR is the primary organization in India for fish gene banking programmes. These are made possible through a repository of biological materials and a live gene bank. This envisages the development of fish sperm cryopreservation protocols and collection of tissue accessions and voucher specimens from Indian fish species.

Fish sperm cryopreservation

Species- specific sperm cryopreservation protocols have been developed for 17 species. Continuous improvement in protocols has provided hatching success ranging from 65 percent to 100 percent of the control value for different species.

Tissue banking

A new thrust is being given to tissue banking, which enables long-term storage of material. Tissue repository accessions are being made with an emphasis on the endemic fish resources of hot spot areas such as the Western Ghats and the northeastern states. Nearly 12 000 tissue accessions for fish species, collected across the country, are maintained in the tissue bank. NBFGR plans to establish linkages so that the tissue bank houses accessions of all the fish germplasm resources.

Live Gene Bank

A live gene bank has been established at the Bureau in Lucknow comprising *T. putitora, Barilius spp., Garra spp., Labeo dayochilus, L. calbasu, Wallago attu, Chitala chitala, Channa marulius* and *L. Bata.* At the regional level, two live genebanks have been established in Guwahati. More species are being introduced in the system so that a suitable package of breeding and cultural practices can be developed.

5. Exotics and Quarantine

The use of exotic species for fisheries and aquaculture diversification has been practiced since the middle of the 19th century. Many such introductions have been successful; but some others have resulted in highly publicized failure and generated controversies over the protection of native biodiversity and the spread of pathogens and disease.

Quarantine and health certification programmes form an integral part of broad strategies at national and international levels to protect the natural environment and native fauna from the deleterious impacts of exotic species or pathogens. NBFGR is upgrading facilities and expertise to safeguard indigenous fish genetic resources from exotic diseases and to develop effective protocols for fish quarantine,

The microbiology laboratory of NBFGR has developed rapid diagnostic capability for detecting the 11 eleven fish OIE-listed pathogens using molecular and immunological tools. NBFGR has achieved success in developing monoclonal antibodies against *L. rohita.* A programme to develop fish cell lines from Indian carp and catfish species has been undertaken at NBFGR. Significant success has been achieved in developing cell cultures from *C. gariepinus* and *L. rohita*. These efforts can lay the foundation for a dedicated facility to screen import and export of live aquatic animals for exotic pathogens as well as pathogens of national concern and for health certification relating to all import and export of live aquatic animals.

NBFGR actively disseminates research tools and information to researchers and students. Besides publishing original research papers in peer-reviewed journals, national as well as international, NBFGR has been regularly conducting training programmes in fish biotechnology, molecular marker development and analysis, genotoxicity assays and disease diagnostics and reporting.

How has NBFGR helped contribute to Food safety and security?

Molecular Diagnostic Capability to identify the 11 OIE-listed Fish and Shellfish Diseases/Pathogens has been developed at the NBFGR, This will help in border and post-border quarantine of live aquatic animal import consignments.

Fish traders are now more conscious of risks associated with the import of exotics. Guidelines for Aquatic Exotics Introduction have been approved by the government. Trans-boundary movement of live aquatic animals has become safer, and a better scientific decision support system now exists to evaluate proposals for import and export of aquatic animals through databases and molecular diagnosis.

Awareness programmes organized recently by NBFGR in Chennai and Mumbai on fish introductions and quarantine have sensitized people in both the public and private sectors to the harm to biodiversity that haphazard introduction of alien species can cause.

Human Resources Development

The technologies and techniques developed by NBFGR are being disseminated to end users through training, demonstrations and publications.

Many training programmes have been organized on techniques developed in the laboratories relating to taxonomy, molecular markers, genotoxcity assays, diagnostic detection and confirmation of OIE diseases. Researches from ICAR and other institutes, from universities, colleges and fisheries departments have benefited from these programmes.

Technologies on culture and management practices are being disseminated to state fisheries officer and also directly to fish farmers.

Impact on policy-making in fisheries and aquaculture

NBFGR is not a capture or culture based fishery institute. Its technologies are an outcome of its work on germplasm conservation. Its clients are scientists and fisheries officers of state governments, the Ministry of Agriculture, the general public and to some extent, fish farmers. A few examples:

Scientific inputs on exotics and quarantine: Inputs were provided to the Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, on the proposal for import of ornamental fish *Betta splendens* (fighting fish) from Malaysia, the import of 18 species of ornamental fishes by a Tuticorin-basd firm, and of 23 species by a Chenai-based firm, the introduction of exotic shrimp brood stock *Litopenaeus vannamei* by two private firms, and on MPEDA's proposals for import of 39 ornamental fishes to India.

This year NBFGR was identified as the nodal institute for all matters concerning introduction of exotic fish germplasm. State governments have been advised to furnish quarterly aquatic animal disease reports to NBFGR, who will process, compile and prepare reports to be submitted to OIE.

Preparation of National Strategic Plan: A National Strategic Plan on 'Exotics and Quarantine of Aquatic Animals' and Guidelines on 'Introduction of Aquatic Exotics and Quarantine' prepared by NBFGR have been approved by the Ministry of Agriculture.

International partnerships and collaborative programmes

The NBFGR collaborates with several international organizations. For example, with the Worldfish Centre, Malaysia on fish germplasm. With the Natural Resource Center, Australia and Auburn University, USA, on molecular markers and genetic characterization. With the US Fish and Wildlife Service on capacity-building in ***in situ*** conservaton programmes. With the WIPO, Switzerland, on International Property Rights.

The future of NBFGR

In the matter of conservation of natural resources, while the developed countries enjoy the technological edge, it is the developing countries that have the resources. Transboundary exchange of germplasm and information for use in product development are essential.

Explorations from new areas such as the deep seas and biodiversity-rich areas like the northeast and the Western Ghats are likely to result in the discovery of new fish species. A national repository of fish genetic material needs to be established and a a national fish museum.

To tackle the problem of the dearth of qualified fish taxonomists, the NBFGR proposes to establish a Center of Excellence on Fish Taxonomy and Molecular Genetics.

Regional Consultation on Safety at Sea in Chennai, India

Forty-three persons from Bangladesh, India, Maldives, Sri Lanka, FAO, IMO, NIOSH, fisheries institutions, and NGOs, besides a few expert consultants, took part in the Regional Consultation on Safety at Sea for Small-Scale Fisheries, held in Chennai on 7 and 8 July, 2008. It reviewed the progress of the South Asian component of the global project on 'Safety at Sea for Small-Scale Fisheries in Developing Countries - GCP/GLO/200/MUL'.

The consultation was funded by the Swedish International Development Cooperation Agency (SIDA) and organized jointly by the FAO, the International Maritime Organization (IMO), the Alaska Centre of the National Institute of Occupational Safety and Health (NIOSH) and the BOBP-IGO.

Mr M K R Nair, Fisheries Development Commissioner, Government of India chaired the consultation.

Welcoming participants, Dr Y S Yadava, Director of BOBP-IGO, said the consultation would review the progress of the South Asian component of the global project on Safety at Sea, which is being implemented in Bangladesh, India, Maldives and Sri Lanka by the FAO in association with the BOBP-IGO. The Project also includes an IMO component that focuses on the development of safety standards for the design, construction and equipment of fishing boats in India and Sri Lanka – where many boats were damaged by the December 2004 tsunami.

Dr Yadava said that 24 000 deaths from fishing at sea occur every year, based on the statistics from developed countries. The figure for developing countries is not known, but could be much higher. He said the global Project on Safety at Sea is aimed at improving the safety of small-scale fishers at sea through awareness and training and safer boats. Another component (being implemented with NIOSH funds) seeks to improve the reporting mechanism to facilitate planning interventions. He thanked FAO, SIDA, NIOSH, IMO and the Government of India for facilitating the consultation.

Mr Jeremy Turner, Chief, Fishing Technology Service, FAO, referred to recent global trends in fisheries. He said that the number of fishers as well as fishing capacity had declined everywhere in the world except Asia. This increase did not auger well for the fishery resource. Reducing fishing capacity was an urgent need. Safety at sea was a complex challenge and needed to be addressed from different angles. He hoped the consultation would contribute to the project's success in South Asia.

In his welcome address, Dr Gavin Wall, FAO Representative in India, explained the role of the FAO in agriculture in general and fisheries in particular. He said that some three billion people live within 60 km of coastline; of these, some 40 million are involved in fishing. He described the FAO as a knowledge manager – it collects, analyzes and disseminates information from a global perspective to help sustainable and responsible management of agriculture and fisheries. FAO also assists technological developments in member-countries, like building value chains from producers to consumers. Community-based fishing models are now the focus of research. The aim is to promote infrastructure, planning and diversification to add to value and improve livelihoods," said Dr Wall.

Expressing his happiness over a programme that concentrated on safety at sea, Mr Nair said that small-scale fishing vessels are ill-equipped and vulnerable to accidents. Most accidents occur due to faulty vessel design, human error and natural calamities. International instruments on safety at sea do not cover small-scale fishing vessels. He urged a holistic approach to

Dr Gavin Wall, FAO Representative in India delivering the welcome address.

tackle the problem of safety at sea for small-scale fishers and hoped that the consultation would help progress in this direction.

Technical presentations

The Technical Session included 12 presentations on activities of the Safety at Sea Project, both global and regional; integration of safety at sea into fisheries management; draft guidelines on safety of fishing vessels below 24 m overall length (OAL); training needs of fishers; community mobilization; the status of legislative support to small-scale fisheries management in the four project countries.

Mr Jeremy Turner made the first presentation on "Safety at Sea as an Integral Component of Fisheries Management". He said a vicious circle exists, where increasing fishing effort leads to depleted stocks and reduced catch per unit of effort. This forces fishers to increase capacity. In the process, they enter into a debt trap. Fishers are also trying to diversify into new fishing techniques for which they are ill-trained and ill-equipped, and are cutting costs and endangering safety. Fishers in general are overworked and fatigued – these are some of the main causes of accidents at sea. The solution lies in safer boats with regulations, training, enforcement and compliance, said Mr Turner.

There are two kinds of fishers who circumvent or ignore safety regulations, said Mr Turner: the greedy ones, who must be regulated, and those who cut costs for economic reasons, who would otherwise comply with feasible regulations. Explaining who fisheries management can address safety issues, Mr Turner said that 12 years ago Alaska had one of the highest fatality rates in fishing. But with a new fishery management regime, the accident rate fell dramatically.

He stressed the importance of information on the causes of accidents. Such data could be publicized to educate fishers and raise their awareness. Further, conditions should be created to improve safety. Better management would improve economic viability, which, in turn could enable stronger safety measures, said Mr Turner. He pointed out that regulations were meaningless without enforcement and compliance. Fishers, fisher families and other interest groups should be involved in formulating regulations.

Mr Jeremy Turner

Mr Per Danielsson

Mr Per Danielsson, coordinator of the global project on Safety at Sea for Small-Scale Fishers, gave an idea of the global context of the Project. He said its immediate objective was fewer accidents at sea. Long-term objective: to improve the livelihoods of coastal populations.

He said the project was being implemented in South Asia (Bangladesh, India, Maldives and Sri Lanka) and West Africa. In South Asia, the project was expected to improve the system of reporting and analysis of accidents at sea; improve rules and regulations for safety of small-scale fishing vessels in line with the FAO/ IMO voluntary guidelines; and better the integration of safety at sea and fisheries management.

Mr R Ravikumar, Regional Coordinator of the South Asian component of the Safety at Sea Project, said that the safety guidelines developed by the erstwhile BOBP for Sri Lanka – after boats there started operating multi-day trips in excess of their capabilities, resulting in accidents – were valid even today. The present Project aimed at pilot-scale activities to build awareness and develop some technical guidelines. Experiences gained could help formulate a larger project to promote safety at sea.

Mr Ravikumar said that the weather, the design of vessels, fishing regulations and human behavior were the factors that affected safety at sea. "Lack of a safety culture, willingness of fishermen to accept risks because of open access, forsaking safety for money, and lack of a structural approach for establishing safety norms were some important human factors. Stakeholders concerned with safety at sea are fisher communities, boatbuilders, national agencies and the coast guard."

He said the immediate requirements were to review baseline data, assess knowledge gaps and prioritize awareness building. Thereafter, a media campaign would be designed and committees set up for monitoring. The awareness materials developed so far related to safety precautions, pre-voyage and post-voyage checklists, internationally accepted distress signals, engine checklists and a video on maintenance of small diesel engines.

A training course curriculum was being developed. It aimed at training fishers to adapt to a rapidly growing modern fleet. The poor quality of fiberglass boat construction in India and Sri Lanka had to be addressed, by training boatbuilders in good FRP practices and ensuring that boatyards adopt working conditions and quality control practices, said Mr Ravikumar.

Expressing his concern about owner-labour relations in marine fisheries, Mr Ravikumar said that owners often fixed targets for the boat crew to meet, without considering safety needs, especially in adverse weather conditions.

Asked how the project would train illiterate fishers, Mr Ravikumar said that fishers couldn't be expected to stop fishing to attend safety classes. The project therefore intended to train a cadre of trainers including some progressive fishers, who would in turn train the fishers.

Dr G Conway, Director, National Institute of Occupational Safety and Health (NIOSH), Alaska Centre, described the "Need for Surveillance and Reporting of Fishing-related Accidents at Sea". He said that in the early '90s, Alaska tied with Iceland in having the most dangerous fishing industry. But the situation improved greatly in a span of 5 to 6 years, and no deaths were reported in 2005. The lessons from Alaska were valid elsewhere. "The first step is to know the problem and address it in the most effective way possible". He presented a model format for surveillance and data collection.

Mr Oyvind Gulbrandsen, naval architect and consultant, presented the proposed "Guidelines on Safety of Fishing Vessels below 24 Meter Length".

He said that maritime safety began with the British Parliament amending the 1871 Merchant Shipping Act to end overloading of cargo in ships. Insurance companies demanded that boats be built to certain standards. But these safety regulations applied only to larger vessels. International standards and regulations on boats less than 24 meters overall length evolved only during the last 30 years, mainly due to the increasing use of FRP for small boats in Europe, the growing number of accidents caused by poor design and construction, and the need for uniform standards all over Europe.

The Regional Consultation in progress.

"Poor quality equates to unsafe boats", said Mr Gulbrandsen. He added that many fishing vessels capsized in inclement weather due to shortcomings in their design. Distress communication was poor or non-existent and fishers often did not receive storm warnings.

He pointed out that in most Indian boats, fishers still do not carry a radio. Inflatable life rafts are expensive; rigid life floats acting as buoyant apparatus are ideal substitutes, he said. In the late 90s, a rigid FRP life float was designed as an alternative to the inflatable life raft under a Technical Cooperation Project of the FAO in Andhra Pradesh, India. Some 100 such floats were distributed to trawlers in the State, said Mr Gulbrandsen.

If rules in BOBP-IGO member-countries were not properly enforced, initiatives like the present Project would have little meaning, Mr Gulbransen cautioned. An independent authority (the Coast Guard in some countries) was needed to implement and enforce safety regulations. He said that fishermen should not be singled out and targeted for compliance with safety regulations; boat owners and boatbuilders should also be targeted.

In discussions that followed the presentations, a representative of the Indian Coast Guard said that there were no regulations to stipulate carrying of life saving appliances on board seagoing fishing vessels. Dr Yadava said that such stipulations did exist in the Marine Fishing Regulation Acts of coastal States, but were not effectively enforced.

Mr Turner remarked that the real challenge lay not in preparing rules and regulations but in enforcing them. Involving the community in enforcement may help solve the problem. Realizing this, the state governments in India are handing over management of some of the fishing harbours to stakeholders. But the sheer number of fishing vessels, especially smaller ones, poses a formidable obstacle, said Mr Turner.

Country presentations on the status of legislative support to small-scale fisheries management

The delegate from Bangladesh said that fisheries legislation in Bangladesh largely aims at resource conservation. The Marine Fisheries Ordinance, 1983 makes a license obligatory for sea fishing. Other important policy documents: the 1998 National Fisheries Policy, the 2000 National Fisheries Strategy, and accompanying sub-strategy and action plan. A committee has been formed to adapt the 1995 FAO Code of Conduct for Responsible Fishing to Bangladesh.

The delegate from India said that that Part XV A of the Merchant Shipping Act, 1958 and amendments to it, enjoined fishing vessels to carry at least two life buoys, one life jacket per crew, EPIRB, SART, life raft and fire fighting appliances. A draft manual on Convention for Standard of Training, Certification and Watch keeping for Fishing Vessels (STCW-F) has also been finalized. It awaits government approval. He said that enforcement of safety regulations in India is weak.

The delegate from Maldives said that the Coast Guard conducts safety inspections once or twice a year. It works in cooperation with the local Atoll Administration and the Federal Government. Safety regulations were promulgated in 1984 but strict enforcement commenced only in 2000. These have been welcomed by fishers. The Government makes regular weather forecasts available to fishers in association with a US-based agency. It has trained some 200 fishers in downloading and using weather information. Fisheries cooperatives are getting popular in the Maldives.

The Sri Lankan delegate said that life-saving appliances are not yet mandatory in fishing vessels. But multi-day fishing boats get a 24-hour high frequency communication network service, and are equipped with SSB radio, while 22 land stations around the island provide weather forecasts. Sri Lanka has also undertaken a programme to build community awareness on safety at sea.

Management and Training Issues

Dr Y S Yadava made a presentation on "Linking Fisheries Management and Safety at Sea". Analyzing the prevailing fisheries management regimes in BOBP-IGO member-countries, he identified gaps with respect to safety. He said that motorization of traditional crafts in India, had increased risks for fishers. Safety is a micro concept, it isn't properly addressed by macro policies, he said. The way boat owners and crew react to policy measures must be studied. The capacity of the community should be built through the precautionary approach to management and awareness campaigns, Dr Yadava said.

Mr Roger Kullberg, Fisheries Officer, FAO made a presentation on "Training needs of Small-Scale Fishers in Safety at Sea". He explained the three lines of defense to prevent fatalities at sea. "Prevention is the first defense. It is the most effective and the cheapest. Next is survival and self-rescue. The third, search and rescue (SAR), is the least effective and the most costly. Training must be tailored to the needs of small-scale fishers and should be undertaken by specialized persons. Special attention should be paid to make the teaching material relevant".

Dr Dilip Kumar focused on "Mobilizing Community in Safety at Sea". Drawing lessons from the FAO/ UNDP/ Government of Bangladesh Project on 'Empowerment of Coastal Communities for Livelihood Security', Dr Kumar said village-level organizations should be community-driven, and should be motivated and facilitated to engage in participatory resource management. Over a period of time, they could become problem-solvers.

Group Discussions

On the second day, the consultation divided itself into three groups to discuss (i) guidelines and other outputs of the Project,
(ii) enforcement and implementation of rules and regulations, and
(iii) integrating safety at sea into fisheries management.

Guidelines and other outputs of the Project: Group 1 noted that traditional boats had evolved over years and were generally safe. But modifications such as motorization added to their risks. While member-countries classified boats on the basis of overall length, the proposed draft guidelines classified them on the basis of sea conditions. The Group recommended that member-countries consider parameters such as area of operation and sea conditions in boat classification. Apart from technical guidelines, member-countries should also consider parameters such as crew accommodation and installation of equipment with regard to stowage, etc, which were part of IMO and ILO guidelines.

Analyzing the training manuals developed under the Project, the Group noted that some training programmes on navigation, boatbuilding and boat maintenance were already being conducted in member-countries. But these targeted the requirements of merchant shipping and did not meet the needs of small-scale fishers. The Group suggested training programme for small-scale fishers that were site-based, with a curriculum and timing suited to them.

The Group urged that a critical mass of trainers be built up in each country, who could then train a large number of fishers. Village Information Centers (VICs) could help out with accident-reporting and information on weather conditions. Pilot-scale projects ought to be implemented to gauge the efficacy of VICS in recording and disseminating information.

Enforcement and implementation of rules and regulations for safety at sea: On the basis of the experiences of member-countries in enforcing rules and regulations concerning safety at sea, Group 2 suggested several measures.

Fishing vessels and personnel must be insured. Life-saving appliances on each vessel should be mandatory. Low-cost but good-quality LSA appliances should be developed for use by small-scale fishers. All boats should carry navigational aids such as compass, GPS, etc. Navigation lights were important too, even small boats should have some form of light. Solar- powered lights should be promoted, especially for smaller fishing vessels.

Some other measures: All boats, irrespective of their area of operation, should carry adequate ration, drinking water, fuel, signals, etc. Boatbuilding yards, irrespective of their size and capacity, should be registered. Boat designs must be standardized and based on approved specifications. All boats must have a standard communication system, depending on the area of operation of the boat. For smaller vessels fishing in inshore waters, cell phones are useful. Discussions with the cell phone companies to increase the range as also affordability may be considered. Community-based safety training programmes for fishers should be organized. The BOBP-IGO should discuss the issue of fishers who drift into the waters of a neighbouring country and get jailed. Standard procedures for repatriation of fishers and their boats should be worked out.

Group 2 suggested awareness programmes; pooling of resources by the enforcement agencies concerned; capacity building and increasing staffing to carry out the all-important job of compliance with safety regulations.

Integration of Safety at Sea into Fisheries Management: Group 3 said that member-countries ought to strive for sustainable management of marine fisheries resources and secured livelihoods of fishers. But they are hampered by lack of manpower, finance and infrastructure, a poor database and a weak MCS. The Group urged NGOs and the media to raise the profile of safety at sea issues. It suggested the following measures to integrate safety into fisheries management in the region:

They should build awareness on safety at sea and set up community-based organizations. Registration and licensing of fishing boats should be through a single window system and multiple licensing should be avoided. Income generation schemes should compensate fishers for loss of livelihood during closed seasons and areas, while savings schemes should be implemented to build up their assets.

Fishers should take part in planning, implementing, monitoring and evaluating resource use, and should coordinate with other stakeholders. Boat owners should provide job security for fishers, minimize their stress, and insure boat and crew. The Government should facilitate setting up of market chains; traders should pay fishers fair prices. The Coast Guard should broaden its role and train fishers on various aspects of safety at sea such as communication and use of life-saving appliances. Research organizations in member-countries should determine the maximum sustainable yields in the respective EEZs and provide inputs on harvestable potential.

Regional Consultation on
Safety at Sea for Small-scale Fisheries

Participants at the Regional Consultation on Safety at Sea.

Concluding Session

Mr Turner said an enormous amount of work was needed to improve the sea safety regime, and a strong political will was imperative. He called for an International Plan of Action for Sea Safety, which could guide national policies. He said the current phase of the Project would end by December 2008, but he hoped that BOBO-IGO in association with FAO would engage countries in further developing the safety regimes.

The chairperson thanked the BOBP-IGO for a successful Consultation in cooperation with the FAO. He said that the integration of sea safety and fisheries management was a new dimension well-received by the participants.

Welcoming the draft guidelines on safety, he said that after finalization, they should be used by member-countries to prepare standards and revise safety laws for fishers. He hoped that the BOBP-IGO would re-align its work programme accordingly. He also suggested a Regional Plan of Action on safety issues to enable a National Plan of Action in the member-countries.

Dr Yadava thanked the FAO, SIDA, IMO and NIOSH for their support and member-countries for their active participation.

National Workshop on MCS in Marine Fisheries in India adopts a National Plan of Action

A National Workshop on Monitoring, Control and Surveillance in Marine Fisheries, jointly organized by the Government of India and the BOBP-IGO, was held in Chennai on 1-2 December, 2008. Taking part were representatives from the Ministry of Agriculture, the Planning Commission, the Indian Coast Guard and the Mercantile Marine Department; several Departments of Fisheries (Andhra Pradesh, Goa, Karnataka, Tamil Nadu and West Bengal) and Union Territories (Lakshadweep and Puducherry); fisher associations; and the FAO.

National Workshop on
Monitoring, Control and Surveillance
1-2 December 2008
Chennai, India
BOBP

Mr Tarun Shridhar, Joint Secretary (Fisheries), Government of India.

Mr Tarun Shridhar, Joint Secretary (Fisheries), Department of Animal Husbandry, Dairying & Fisheries (DAHD&F), Ministry of Agriculture, chaired the opening session.

Welcoming participants, Dr Y S Yadava, Director, BOBP-IGO, recalled that this national workshop and a national plan of action on MCS had been suggested in the ***Chittagong Resolution*** of the January 2008 Regional Workshop on MCS.

Dr Yadava said that west coast states such as Gujarat, Kerala and Maharashtra were not represented at the workshop, nor Orissa. This indicated that MCS "is yet to be a priority in fisheries management in many coastal States". In many developed countries, on the other hand, MCS is deeply rooted in fisheries policy. "These countries are now moving from a conventional command-and-control type of MCS to more participatory forms of monitoring and control". This made MCS more cost-effective said Dr Yadava. Even in some Asian countries, MCS was now an integral part of responsible fisheries. In South-east Asia, some countries were moving towards regional strategies.

Expressing his grief over 9/11, Dr Yadava said that in the past too, fishing vessels had been used for unlawful activities. A strong MCS regime in maritime states could help strengthen national security. He hoped the two-day Workshop would analyze issues concerning implementation of MCS in India and emerge with an implementable action plan.

In his inaugural address, Mr Shridhar said the focus of MCS in India was on control and

The National Workshop in progress.

Commandant Donny Michael

Dr C. P. Juyal

Mr Sebastian Mathew

surveillance rather than on monitoring. The MCS regime in India was weak because data was poor. A good database, strong institutional backing, the support of stakeholders and a consensus among them to adopt MCS, were essential. MCS should go beyond VMS (vessel monitoring system). It should be perceived as a measure to protect livelihoods, not as a policing activity. Making MCS high on the political and governance agenda was a challenge, Mr Shridhar said. He added that the Ministry of Agriculture has provided budgetary support for fisheries management in the 11th Five-Year Plan.

Mr Shridhar said that fish production had gone down in 13 of the world's 15 ocean zones, while the two Indian Ocean zones were still productive. He called for a proactive approach so that these zones remained productive. Some 50 percent of fish stocks worldwide were over-exploited, the reasons behind depletion of fish stocks should be ascertained.

Illegal, Unreported and Unregulated (IUU) fishing is becoming rampant, Mr Shridhar said. Some 25 percent of the global fish catch originates from IUU vessels. IUU fishing can't be brought down overnight. Apart from regulation, better scientific, economic and social understanding of fisheries was essential. The Coast Guard had the major responsibility for surveillance of the EEZ, but it could not focus on fisheries alone. Port State responsibilities too were not being addressed adequately.

Mr Shridhar said that issues in fisheries varied from open access to regulated access to rights-based fisheries. The pressure on capture fisheries could be reduced by lowering post-harvest losses and strengthening aquaculture.

Technical presentations

In a presentation on "*Monitoring, Control and Surveillance in Small-scale Fisheries – Guiding Principles and Practices*", Dr Y S Yadava said that the impact of small-scale fisheries was often overlooked due to its low scale of operation. MCS in India was a challenge because of the predominance of small-scale fisheries and its highly dispersed nature. He called for a time-specific plan of action on MCS and for strengthening national agencies responsible for MCS as per the ***Chittagong Resolution***.

Dr C P Juyal, Fisheries Research and Investigation Officer, DAHD&F, made a presentation on "*Overall Status of Marine Fisheries in India and its Preparedness for a MCS Regime*". He described the status of fisheries resources in the Indian EEZ and the potential for deep sea fishing, particularly of tuna and tuna like species. He described existing legal mechanisms and the salient features of the 2004 Comprehensive Marine Fishing Policy of the Central Government. He said that many new initiatives were planned in the 11th Five-Year Plan to strengthen resource management and introduce satellite-based surveillance measures (Vessel Monitoring System or the VMS) for fishing vessels.

Group Discussion in progress.

Participants engaged in Group Discussions.

Mr Sebastian Mathew made a presentation on *"Rights-based Marine Fisheries Management a nd the Role of Fisher Community in Implementation of Monitoring, Control and Surveillance in India"*. He said existing legislation on marine fisheries in India should complement and strengthen international instruments to which India was signatory. He said that if millions of automobiles could be registered annually, registration of fishing vessels should not be regarded as insurmountable.

Mr Mathew said that powers for resource management ought to be legally delegated to the fisher community. He called for a management architecture for sustainable development of fisheries. During discussions that followed the presentation, references were made to the appalling conditions of hygiene and sanitation on fishing vessels; the lack of effort to promote co-management; and the lack of political support for devolution of power to panchayats. Responding to the questions, Mr Mathew said that legal reforms were needed to recognize traditional management arrangements and their adaptation to facilitate an equitable rights-based approach.

In the workshop's final technical presentation, Dr Yadava reviewed the Marine Fisheries Regulation Act as well as the rules, regulations and notifications of coastal States and the Union Territories (UTs), and highlighted gaps relating to MCS. He discussed provisions in international binding and non-binding instruments like the 1982 United Nations Law of the Sea, the 1993 FAO Compliance Agreement, the 1995 UN Fish Stocks Agreement and the 1995 FAO's Code of Conduct for Responsible Fisheries.

During discussions, participants raised several issues – such as weak patrolling; the failure of a central scheme in the late 90s under which patrol boats had been provided to coastal States; the lack of efforts to optimize fishing fleet size; poor enforcement of regulations to prevent fishing in restricted areas. Participants pointed out that some countries had switched effectively from *de facto* open access fishery to regulated access fishery through effective implementation of registration and licensing procedures in consultation with the stakeholders.

Participants suggested that panchayats should be involved in fisheries governance. They said the focus of fisheries development in most states was on fisher welfare programmes; development aspects and MCS were overlooked. On VMS, the workshop felt that caution should be exercised in applying this technology to small fishing vessels.

Working Group discussions

Four Working Groups were formed to discuss the following issues:

Group 1: Registration and Licensing of Fishing Boats, Demarcation of Zones, Colour Coding, Communication and Surveillance Infrastructure

Group 2: Estimation of Fishing Capacity, Maximum Sustainable Yield and Optimization of Fishing Fleet.

Group 3: Governance, Policy and Legislative Support to MCS.

Group 4: Institutions, Human Resource Development and Role of Non-Governmental and Community-based Organizations.

Mr M K R Nair, Fisheries Development Commissioner, chaired the proceedings. Presenting the recommendations of Group 1, Mr Ravi Kumar stressed the urgent need for registration and licensing of all seaworthy fishing vessels and for stronger surveillance. He recommended the use of an Automatic Identification System (AIS) for all vessels below 15 meter LOA. On the impoundment of fishing vessels that violate rules and regulations, he said fishing harbours and fish landing centres do not have

National Plan of Action on MCS – India

Resource Estimation

Marine fish landings should be estimated regularly on the basis of a scientifically designed programme, which should be uniform for all coastal States and Union Territories (UTs). Data should be included on biological aspects of commercially important fin and shellfish species. Data should be obtained separately on fish landings from the territorial waters and those from the Exclusive Economic Zone (EEZ). Stock assessment should be carried out at regular intervals.

Estimation of Fishing Effort and Adjustment of Fishing Capacity

Deployment of fishing fleet/ effort by coastal States/ UTs in their territorial waters should be commensurate with the potential yield estimated for such area.
It should be made mandatory for fishing vessels to file log sheets containing information on species-wise fish catch, area of operation, effort deployed, etc after each fishing trip to the designated authority. Such mechanisms should be imposed first on harbor-based mechanized fishing vessels, and extended later to other categories of fishing vessels.

Registration and Licensing of Fishing Vessels

All sea-worthy unregistered and unlicensed fishing vessels should be registered/ licensed.

To overcome the shortage of manpower, the Mercantile Marine Department (MMD) may consider delegating registration powers for fishing vessels less than 20 meters Length Overall (LOA) to the Department of Fisheries (DoF) of coastal States and UTs.

Fishing vessels and crew should be insured. Such insurance should be mandatory for vessel registration and for grant of a licence. Colour coding of fishing vessels should also be mandatory – to indicate the port of registry and the licensed zone of operation.

Infrastructure Development

The existing landing and berthing facilities cater to the requirements of only about 25 percent of the fishing fleet in the country. Result: acute congestion in fishing harbours and landing centres. A thorough assessment must be made of existing infrastructure facilities.

Surveillance

The coastal States/ UTs should provide marine fishers with Identity Cards after proper verification.
A comprehensive surveillance mechanism should be evolved. Such a mechanism should involve the Indian Coast Guard, State Governments and UTs and stakeholders. Fishing vessels operating in territorial waters should use Channel 16 exclusively for distress communication. Separate channels should be used for other communication.

Review of Fisheries Legislation

The Central Government should enact a central legislation to regulate fishing in the EEZ by

Indian vessels, A thorough review should also be done of existing fisheries and supporting legislation, and MCS features should be incorporated. Adequate manpower and funds should be provided for MCS. Where relevant, MCS provisions may be delegated to agencies such as the Marine Enforcement Wing and the Coastal Protection Police.

Fisheries Policy and Management Frameworks

Based on the 2004 Comprehensive Marine Fishing Policy of the Central Government, all coastal States/ UTs should formulate policies in concert with stakeholders. The policies should clearly define the objectives and goals of fisheries development. They should ensure decentralization. They may consider promoting rights-based fisheries management to the extent possible. Such policy documents should be dynamic in nature and allow for periodic revision.

Management plans for major fish stocks should be formulated by the Central Government in coordination with States/ UTs. Where sufficient data are lacking, such plans may rely on the 'precautionary approach'. The plans may consider fixed time schedules for allowing the stocks to be harvested, *ex situ* and *in situ* conservation and management measures and stock enhancement using proven technologies such as artificial reefs, fish aggregating devices and sea ranching.

The MCS, which is an integral part of fisheries management, should be implemented in stages. The first stage should include mandatory registration and licensing. The second stage should take up enforcement of the provisions contained in the rules and regulations. Involvement of stakeholders from the very beginning would help promoting voluntary compliance by fishers and other concerned user groups.

To coordinate various activities related to fisheries management (*e.g.* management plans, MCS, safety at sea, exercise of coastal State jurisdiction, port State and flag State control), the setting up of dedicated Fisheries Resource Management and Enforcement Units (FRMEU) may be considered.

Capacity Building and Empowerment

The DoF in each state ought to be adequately staffed with trained technical manpower to address issues of sustainable fisheries development. Capacity-building of fisheries staff should be undertaken in a planned and systematic way. Fisheries institutions and other agencies concerned with fisheries management should also be strengthened. .

The fishing community should be empowered to participate in fisheries management programmes. Its skills and capacities should be enhanced through short-term highly focused vocational trainings and hands-on workshops. The socio-economic well being of fisher community should be improved. Living conditions of fishers on board fishing vessels should be improved.

Community Mobilisation, Communication and Awareness

Fisher communities should be mobilized to assist in implementing fisheries management programmes. Fisher cooperatives should be strengthened and co-management should be promoted. Community interaction programmes should be undertaken on issues such as resource management and formulation of management plans, MCS, safety and survival, health, hygiene and literacy. Women must be included in such programmes.

The print and electronic media should be made use of to the fullest extent to educate fishers about fisheries management and to build stakeholder capacity.

Success stories (and stories of failure) in fisheries management should be documented and shared with fishers and other stakeholders. Vocational education for fishers and non-formal education of fisher's children should be promoted. These will prepare the community for resource ownership.

Coordination and Networking

The Central Government should constitute an interdisciplinary committee to help implement the MCS action plan and monitor progress through performance indicators.

space to keep such boats. The group called for revamping of the two 24-month training courses conducted by CIFNET, Kochi, which were oriented to merchant shipping; they ought to be more relevant to fisheries.

Some of the points made during discussions: While estimating fishing capacity, both the length of the fishing vessel and gross tonnage (fish hold capacity) should be considered. Working conditions in fishing vessels (as provided for in the ILO Convention on 'Work in Fisheries Sector') should be taken into account while issuing licences to fishing vessels. Resale of fishing vessels should be done with the knowledge of the DoF. The antecedents of boat owners should be verified by the police prior to registration. Life- saving appliances in fishing vessels should be mandatory. The area of operation should be mentioned in licenses issued to boat owners. The various Marine Fishing Regulation Acts/ Rules should be streamlined and harmonized with the Merchant Shipping Act to the extent possible.

Presenting the recommendations of Group 2, Dr H Mohamed Kasim urged the need for regular stock assessment, for estimation of maximum sustainable yield, for infrastructure enumeration, etc. Some points made during discussions: (i) Should log sheets be used to estimate fish landings? (ii) An 'allowable catch' should be fixed for selected fish stocks. The 'precautionary approach' should be adopted for management (iii) Commercially important stocks should be considered in place of species. (iv) Opening and closing seasons should be declared for fisheries to ensure sustainable fishing.

The chairperson urged coastal states and UTs to urgently assess fleet capacity and prepare an inventory of boatbuilding yards.

Presenting the conclusions of Group 3, Commandant Donny Michael described MCS as a misnomer in India. Coast Guard officers, who have the prime responsibility for MCS in the EEZ, do not undergo any MCS course after an initial capsule programme at CIFNET. During discussions that followed the presentation, it was suggested that fishing vessels be marked with radio identification frequency and that the DoF in each state should exercise greater control on small-scale fishing in territorial waters. The Ministry of Agriculture is contemplating the use of VMS on all categories of fishing vessels, also proposing a new Bill to regulate fishing by Indian vessels in the EEZ.

Making the presentation of Group 4, Commandant Paramesh said that existing fisheries and other institutions contributed in one way or the other toward implementation of MCS. During discussions, it emerged that the workshops conducted periodically by the zonal bases of the Fishery Survey of India discuss MCS. Empowering the DoF was essential to successfully implement MCS, the workshop was told.

Draft National Plan of Action

A draft National Plan of Action for Implementation of MCS was prepared by the BOBP-IGO secretariat on the basis of the Working Group recommendations and participant feedback, and presented at the workshop's concluding session (see box on pages 18-19). The chairperson, in his concluding remarks, asked coastal States and to include the plan in their own work plans, and involve Panchayati Raj institutions in planning and implementation.

National Workshop on
Monitoring, Control and Surveillance

Participants at the National Workshop on MCS.

Useful bi-national workshop on safety of small fishing vessels in India and Sri Lanka

Eighteen persons – officials from India and Sri Lanka, along with representatives from the FAO, SIDA, the International Maritime Organisation (IMO), and the National Institute of Occupational Safety and Health (NIOSH), Alaska, USA – took part in a Bi-National Workshop on Small Fishing Vessel Safety in Chennai on 09 July 2008. The Workshop was organised jointly by the FAO, SIDA, NIOSH and the BOBP-IGO. Mr M K R Nair, Fisheries Development Commissioner, Government of India, was in the chair.

Small Fishing Vessel Safety

The Bi-national Workshop in progress.

Dr Y S Yadava, Director, BOBP-IGO, said the workshop would take a closer look at small fishing vessels in India and Sri Lanka, which share some common characteristics and were heavily affected by the December 2004 tsunami.

Mr Jeremy Turner of the FAO said that the Regional Consultation on Safety at Sea had addressed a host of issues related to sea safety, but the present workshop focused on post-tsunami developments in India and Sri Lanka. He said that sea safety had important socio-economic dimensions. Viability of fishing through control of fishing capacity was inseparable from safety.

Capt B Vormawah (IMO) said that the IMO was the UN body responsible for maritime regulations. It worked together with FAO in several areas such as the Working Group on Illegal, Unreported and Unregulated (IUU) fishing including monitoring of fishing vessel movements. The two agencies had met in January 2005 and developed a joint plan for future action. A meeting between the Swedish Maritime Administration and the IMO in February 2006 had paved the way for a SIDA-funded project on tsunami reconstruction and rehabilitation in the Bay of Bengal focusing on small fishing vessel safety.

Capt Vormawah said the IMO was surprised to find that no guidelines existed for construction of small fishing vessels in the region. The IMO component of the global project on safety at sea sought to fill that void.

The representative of Department of Fisheries, Tamil Nadu, said that small-scale fishers were conspicuous along the 1 000 km-long coastline of the state. FRP boats seemed to be replacing traditional wooden catamarans. He hoped that the proposed guidelines would be useful in regulating the construction of boats and in setting up boatyards.

Mr Nair said the workshop would focus on boat design and construction norms and on the design of boatyards. He said India had sufficient expertise in building commercial and cargo boats. Fishing boat development was undertaken after Independence in 1947 starting with 32 ft fishing vessels and later of 48 ft vessels. This was followed by the construction of 70.5m Mexican trawlers with steel and the introduction of Norwegian technology. Small-scale boat construction is a vibrant activity but hindered by the shortage of quality wood. Boatbuilders have experimented with alternative materials – ferrocement, steel and currently, FRP.

Mr Nair said that construction technology has been deficient. Most boats have compromised with safety. Result: short lifespan and accidents as well. While some of these issues are being addressed, the tsunami had triggered action and brought in IMO and FAO assistance. He hoped that the guidelines proposed by the project consultants on the basis of their survey would be useful.

Technical Presentations

Five presentations were made in the workshop's technical session.

Mr R Ravikumar focused on environment impact assessment in India and Sri Lanka and on safety issues concerning motorization of small fishing crafts in India. Mr Roger Kullberg discussed issues concerning FRP boat construction in India. Mr Oyvind Gulbrandsen made a presentation on technical guidelines for fishing crafts in India and Sri Lanka.

It was pointed out during the technical session that in India, the popular large-size FRP boats (> 14 m) lack quality control. Lamination is poor, particularly in post-tsunami boats, resulting in hull damage due to abrasion. Fishers try to tackle this with a plaster of cement and sand on the bottom of the boat – a practice that undermines boat safety.

A major safety concern with trawlers arises from their faulty design: a good catch threatens stability! Another important issue is the poor engine installation and fitting: boatbuilders use cheap fittings that are not properly galvanized.

For FRP canoes, the long-tail engine is quite popular because of its easy maneuverability. But since the engine and the propeller have to be started while the fishers are pushing the boat in the water, the longtail threatens safety. Fishers have often been wounded and even killed. In Sri Lanka on the other hand, safety concerns arise from management of the boat. Many single-day boats have been converted to multi-day boats though their design is ill-suited for the latter. The stability of such boats can be compromised if the cabin top is overloaded. Many boats use plastic pipes in the engine room – a fire hazard.

The consultants found that in Tamil Nadu, some 35 percent of the 4 000 or 5 000 FRP kattumarans supplied by various NGOs after the tsunami faced major problems like hull leak, hull abrasion and cracks. Some 10 percent had been reduced to scrap; even the good boats would not last more than five years from their date of commissioning. This means that two or three years from now, a whole batch of boats will pose serious safety and environmental threats to marine fisheries.

It was pointed out that fishers carry out most repair work themselves, because a repair shop is far away. As for motorization of small fishing craft in India, the pros and cons of existing long tail motors were highlighted. A matrix on safety issues was discussed.

Mr Gulbrandsen said that the proposed technical guidelines were a simplified and adapted version of the Canadian standards for safety of small vessels. He classified the vessels thus: Category A – Ocean; Category B – Offshore; Category C – Inshore; Category D – scattered waters. This functional classification, based on the area of operation of vessels and wave length, is meant to replace the traditional classification based on the length of the boat.

Mr Gulbrandsen said that the new categories would reflect the scantlings and the strength of the hull. He pointed out that in India many open FRP boats lack floatation. However, while wood is unsinkable, the open FRP boat is sinkable.

For FRP boats, floatation is even more important than lift jackets, said Mr Gulbrandsen. He said that sails were becoming obsolete. Sails should be promoted instead of motorization – since sails not only save fuel but provide a lifeline for the crew when engines fail.

Discussions

Discussions focused on three basic safety issues: disposal or replacement of inferior boats delivered after the tsunami; standardization of designs, material and construction/ maintenance of crafts including public finance; and enforcement of rules and regulations.

Also discussed was the disposal of old and usable FRP boats. Participants agreed that it's not practical to return them to the NGOs who supplied them. It was suggested that the Government of India discuss with the Government of Tamil Nadu plans to dispose of scrap. Participants expressed concern about the livelihood of fishers once the FRP boats are rendered useless. There's no easy solution, however.

Participants from Sri Lanka said that boat designs are based on what the client wants: it's usually greater fish-holding capacity and higher speed. Builders try to provide these and at a price buyers will find attractive. They end up compromising safety.

Mr Babu Rao said that in the initial stage of development, FRP boats in India were constructed in Government boatyards with effective supervision. But control is absent now, and all types of boats are being constructed. In Sri Lanka, there's a draft legislation in Parliament to address quality problems.

Participants agreed that practical regulations should be devised, based on consultations with boatbuilders and stakeholders. This may be a lengthy process, but it will lead to sensible guidelines for safe boats that meet the needs of industry as well. It was also suggested that boatbuilders should be given guidelines rather than rigid parameters – since requirements vary across the coast both in India and Sri Lanka.

Representatives from India remarked on the deterioration of design and material used in FRP boats during the last 20 years. Old boats are still in use, but recent boats are failing. Participants from Sri Lanka said that the increasing costs of fuel and materials should be borne in mind while devising regulations. Tax should be waived on materials used for small vessels.

The chairman said that in India the BIS (Bureau of Indian Standards) certification could be used as the standard for materials.
Mr Gulbrandsen remarked that boat thickness should be specified, it has an important bearing on safety.
Mr Ravikumar said there are two aspects to boat design: functionality and structural integrity. While the former could be left to the client, structural integrity should be standardized through a set of guidelines for boatyards.

The workshop noted that at one time, Lloyd's classification was adhered to as the standard for 10-meter FRP trawlers. But newly established boatyards don't follow this practice at all. Lloyd's classification should perhaps be re-introduced as the minimum standard.

The workshop agreed on the following points:

- Unlike wooden boats, FRP boats cannot be constructed on the open beach. Since FRP is not an environment-friendly material, boatyards must exercise the right precautions. FRP standards are non-negotiable and must be enforced. Every boat must have a certification mark for standards.
- Boatbuilding practices in India must be improved. A good shed, trained labourers, storage facilities and a proper infrastructure are needed. Sri Lanka has just 20 boatyards now, as compared to the 70 boatyards after the tsunami, all of them certified according to standards like infrastructure, facilities and electricity. Result: improved quality of construction of boats.
- Hulls must have enough layers of fiberglass.
- Standardization should be done step-by-step, beginning with basics like thickness and coating. Once the basic standardization is achieved they can be updated periodically.

Concerning regulation and construction of boats, setting up of boatyards, training of boatbuilders, enforcement of regulations and certification, and availability of public finance for boatyards, the workshop observed:

- There's no point in developing guidelines if politicians are not on board. Surveyors and boatbuilders should be trained together to establish rapport with one another, also to ensure that they have the same understanding of the material.
- The National Engineering Training Institute for fisheries and boatbuilders in Sri Lanka has launched programmes at national and regional levels. This institution is also capable of training inspectors.
- Surveyors should have an in-depth understanding of how boats should be built and what the regulations mean in practice. They should correct builders before construction of a boat, not after.
- In Sri Lanka, the authorities are discussing boat design with architects, who are guided by boat design manuals.
- Bank loans are available for boats; implementation of standards may make it easier to get those loans.

On the enforcement of regulations in Sri Lanka and the adoption of draft guidelines for legislation in India, the workshop agreed that:

- In Sri Lanka, draft regulations are being considered by Parliament, but there is no plan yet as regards enforcement.
- International standards on safety at sea must be legislated in India, so that requirements on boat design, boatbuilding, and safety at sea equipment can be enforced. The Ministry of Shipping can enforce safety at sea; state governments can supervise other aspects in coordination with various ministries.
- The quickest way to effect changes is to enforce laws already on the books. Registering boatyards does not need new legislation. But stakeholders must be consulted on the draft guidelines, which must be modified as needed.
- Consultation must be preceded by an awareness drive with stakeholders on the what, why and how of regulation. Such a drive will facilitate compliance.

Concluding session

Mr Jeremy Turner said the workshop had methodically analyzed problems on a wide ranges of issues. Member-countries had to strive to bring in legislation and implement it to improve sea safety. "Political will and a brave heart" were called for. Capt B Vormawah of IMO complimented the workshop on a hard day's work that had ended well. She urged India and Sri Lanka to accept the draft guidelines suggested by consultants for construction of FRP boats.

Chairperson M K R Nair said the workshop had been thorough in discussing problems and identifying action, all in a single day. It had come up with a roadmap for implementation.

Dr Yadava said the workshop was effective in shaping the project's future activities. He thanked FAO, SIDA, IMO and NIOSH for their support.

Asia-Pacific Fishery Commission endorses past work, discusses future plans at meeting in Manado, Indonesia

The Asia-Pacific Fishery Commission (APFIC), held its 30th session in Manado, North Sulawesi, Indonesia, on 11-13 August 2008, Thirty three persons – representatives from 15 member-countries, plus observers from SEAFDEC, the BOBP-IGO, the Swedish Board of Fisheries and the FAO – took part. The meeting followed the second session of the APFIC Consultative Forum (see pages 26-28) at the same venue.

The meeting reviewed the activities of APFIC since the 29th session, deliberated on a draft overview on the status and potential of fisheries and aquaculture in the region, considered the recommendations of the second APFIC Regional Consultative Forum Meeting (RCFM), discussed two expert workshops organized by APFIC, endorsed major themes for the next biennium (2009-10) and also discussed the organization's strategic plan for 2008-12.

Mr Ndiaga Gueye, Chief, International Institutions and Liaison Service, Fisheries & Aquaculture Department of FAO welcomed participants on behalf of Mr Ichiro Nomura, Assistant Director-General (Fisheries) of the FAO. Mr Freddy Numberi, Minister of Marine Affairs and Fisheries, Republic of Indonesia, referred to his country's close co-operation with FAO and APFIC. He cited the RPOA (Regional Plan of Action) initiated by Indonesia along with Australia to promote responsible fisheries practices including combating illegal, unreported and unregulated fishing (IUU). He described it as the first regional plan of its kind in the world.

APFIC activities since the 29th session: The APFIC Secretary summarized the main events and activities undertaken by APFIC since its last session held in Kula Lumpur (21-23 August 2006). These included

- Two regional workshops held in 2007 in Phuket and Ho Chi Minh city.
- Collaboration with regional and international projects such as BOBP-IGO, Mekong River Commison, NACA, SEAFDEC, WorldFish Center and ICSF.
- Assistance to members, such as participation in the RPOA to promote responsible fishing practices and technical inputs for a workshop to consider the risks and benefits of introducing ***Penaeus vannamei*** into India.
- Information dissemination through an excellent medium, the APFIC website (http://www.apfic.org), and 14 publications.

Overview: Status and Potential of Fisheries and Aquaculture in Asia and the Pacific

The meeting heard a summary of a draft of this document. Some highlights:

Asia accounted for 87 percent of the 41.4 million persons engaged in fisheries and aquaculture production. Total catch in tropical areas of the Asia-Pacific region was 23.1 million tonnes. In tropical waters, coastal stocks may be more diverse and perhaps more resilient in the face of heavy fishing pressure (in terms of biomass) than in temperate waters. Finfish requiring lower inputs (such as tilapia, carps and barbs) have been important food fish for developing states of the Asia-Pacific region. Many of these species are grown and cultured in backyard ponds – an activity often not captured in official statistics.

Congratulations
ASIA PACIFIC FISHERY
COMMISION (APFIC)
2nd REGIONAL CONSULTATIVE
FORUM MEETING
6-13 AUGUST 2008 MANADO INDONESIA
KANTOR WILAYAH
BRI MANADO
Congratulations
2nd REGIONAL CONSULTATIVE
FORUM MEETING
AND 30th ASIA PACIFIC FISHERY
CONMISION (APFIC)
6-13 AUGUST 2008 MANADO INDONESIA
PT BANK NEGARA INDONESIA
(PERSERO) Tbk
CABANG KANAKA

Dominant commercial species under culture were brackishwater shrimps, freshwater prawns and freshwater/brackish water crabs. Two major species accounted for over 60 percent of the total crustacean production in 2006 – the whiteleg shrimp ***P.vannamei*** and the giant tiger shrimp ***P.monodon***.

Aquaculture production in the Asia-Pacific region was 46.3 million tonnes – 90 percent of the global figure – sparked mainly by continued growth in China. South Asia's aquaculture production had tripled in 15 years, from 1.4 million tonnes in 1991 to 4.2 million tonnes in 2006, and also diversified.

As for capture fisheries, the phenomenon of fishing down the food chain – of capture of smaller and less valuable species – was noticeable. Shark catches were falling in temperate waters, going up in tropical waters. Tuna catches (the largest constituent of pelagic species) had declined steadily in temperate waters of the Asia-Pacific since 1965.

The Commission recommended that APFIC member-countries provide statistics that include catch effort and vessel numbers; improve estimates of production from backyard systems; provide improved disaggregated reports of the production in aquaculture. The Commission urged a 'constructive dialogue' on Marine Protected Areas between fisheries and environmental agencies to utilize their social and environmental benefits.

Regional workshops on capacity management and certification

The findings and recommendations of two APFIC regional consultative workshops on "Fishing capacity management and IUU fishing" (Phuket, Thailand, 13-15 June, 2007) and "Certification schemes for capture fisheries and aquaculture" (Ho Chi Minh city, Viet Nam, 18-30 September 2007), both funded by Sweden, were discussed.

The first workshop sought greater awareness, understanding and action on making fishing capacity commensurate with the productive capacity of the fishery resource and ensuring its sustainable utilization. The workshop adopted a document on how to address the issues of IUU fishing and capacity reduction. The meeting agreed that the Southeast Asia RPOA is a useful framework for countries and regional organizations.

The second workshop reviewed costs and opportunities associated with certification schemes for fisheries and aquaculture in the APFIC region. The workshop recognized that certification leads to many benefits but several issues must be addressed first – such as regional involvement, inclusion of small-scale fishers and farmers, harmonization of certification schemes, cost-benefit analyses, good governance and stakeholder involvement and capacity-building at national and regional levels. Some recommendations were made.

The Commission was told that many APFIC countries have approved or are drafting national plans of action on IUU fishing. The BOBP-IGO said it had initiated a programme on monitoring, control and surveillance (MCS), and that national action plans for MCS were being developed together with member-countries. The secretariat urged members to send policy information to APFIC for uploading on its website.

Members outlined measures they had taken to manage fishing capacity, China has removed 26 000 vessels from its marine fishery; 80 000 fishers have left the fishery and are being trained for onshore livelihoods. India is capping its motorized artisanal fleet at 50 000 craft and limiting the number of commercial vessels. Malaysia is reducing trawler capacity. The Philippines is refining zonation of coastal areas and shifting excess capacity. Sri Lanka has completed a comprehensive census to establish a database. Thailand has frozen the number of trawlers and push nets, brought in mesh size controls and undertaken a pilot low-cost vessel positioning system.

On certification, the Commission recommended special attention to workable certification schemes for small-scale farmers and fisherfolk and regional inputs to ensure harmonization of certification schemes. It urged that certification schemes should conform to FAO guidelines on ecolabelling of marine capture fisheries products and the forthcoming FAO guidelines on certification of aquaculture products.

The Commission endorsed the recommendations of the RCFM (see pages 26-28). It also heard accounts of regional arrangements and initiatives such as the RPOA, SEAFDEC-ASEAN, the Coral Triangle Initiative, as well as the 27th session of COFI (5-9 March 2007) held in Rome. The secretariat urged members to inform COFI about management initiatives in the Bay of Bengal, the South China Sea, the Yellow Sea and other small ecosystems; implementation of the CCRF (Code of Conduct for Responsible Fisheries); application of the Code to aquaculture; and measures to control IUU fishing.

India informed the meeting that the CCRF is being translated into local Indian languages with the support of the BOBP-IGO, and that this work would form the basis for a national CCRF. The BOBP-IGO pointed out that the CCRF would be 13 years old in October 2008. A review would be timely.

The meeting was told that FAO guidelines for aquaculture certification were being developed. Expert workshops for the purpose had been held in Bangkok (March 2007) and Beijing (May 2008).

APFIC will hold its 31st session in South Korea in September 2010, in conjunction with the third RCFM.

Adapting to emerging challenges in the Asia-Pacific: APFIC Consultative Forum holds useful meet in Manado, Indonesia

Many of the new and emerging challenges to fisheries and aquaculture in the Asia-Pacific were discussed at the Second Regional Consultative Forum Meeting (RCFM) of the Asia-Pacific Fishery Commission (APFIC), held in Manado, North Sulawesi, Indonesia, from 6-9 August, 2008.

Participants exchanged ideas, experiences and insights on challenges in the fisheries sector. Some valuable recommendations emerged, some pathways to progress were highlighted.

The theme title was "Adapting to emerging challenges: promotion of effective arrangements for the management of fisheries and aquaculture in the Asia-Pacific region".

The once-in-two-years RCFM serves as a forum for analysis, synthesis and agreement on actions needed to reshape fisheries and aquaculture in the Asia-Pacific region. This second RCFM preceded the 30th session of APFIC held later at the same venue. (The first APFIC-RCFM which met in Kuala Lumpur in 2006 focused on the theme "Reforming fisheries and aquaculture in the Asia-Pacific region").

Ninety two persons from 17 countries plus representatives from 15 organizations took part in the second RCFM, which was hosted by the Government of Indonesia, the FAO and APFIC.

Sida
ASIA-PACIFIC FISHERY COMMISSION (APFIC)
2nd REGIONAL CONSULTATIVE FORUM MEETING

Prof. Widi Agoes Pratikto, APFIC chairman and Secretary General, Ministry of Marine Affairs and Fisheries (MMAF), Indonesia, welcomed participants. Mr Ichiro Namura, Assistant Director-General of Fisheries, FAO, Rome, pointed out (in a message read out in his absence) that APFIC is the world's oldest fisheries commission. The RCFM enables discussion and action on the outcome of important workshops on select issues.

Dr S H Sarundajang, Governor of North Sulawesi, said APFIC's role as a policy platform was important in a world of changing climate and changing trade patterns.

Session 1 reviewed the "**status and challenges in fisheries and aquaculture in the region**". In his keynote address on "Adapting to emerging challenges", Prof Hasjim Jalal, International Ocean Law Adviser to the Minister, MMAF, urged more effective synthesis of scientific findings, greater consistency in implementation of agreements, a shift in focus of member-countries from production to sustainable use, improved cost-effectiveness and efficiency, better monitoring and feedback on progress.

Dr Simon Funge-Smith, APFIC Secretary, summarized "Status and potential of fisheries and aquaculture in Asia and the Pacific". He said that in 2006, capture fisheries from the APFIC region made up 52 percent of global production. Major trends in capture fisheries: a large increase in inland fisheries in South Asia, improvement in quality of reporting from China, leveling-off of production in Japan and South Korea. Aquaculture production in the region accounted for more than 90 percent of global production, China continued to be the dominant state. In South Asia, inland water culture production had tripled in three years. He said member-countries should improve estimates of production from backyard systems. As regards the future, it looked good – significant progress in fisheries governance, improvement in aquaculture management – but many challenges still needed to be addressed.

The session heard member-countries describe actions and achievements concerning items identified by the 29th session of APFIC. These related mainly to mainstreaming co-management into fisheries management, and reducing the catch of low-value/trash fish, especially from marine coastal waters. Many countries reported good progress.

Session 2 discussed **"Capacity management and IUU fishing in the Asia-Pacific region".** The Phuket workshop of June 2007 on the subject was recalled. Key steps in capacity management were assessing current capacity, developing national plans of action, and introducing rights-based

measures. Excess fishing capacity should be removed and not transferred to other fisheries.
On IUU fishing, steps must be taken to ensure that flagged vessels do not undermine conservation and management effort. APFIC members ought to share data and information to tackle IUU fishing.

Regional initiatives to promote fisheries management – such as those of SEAFDEC, the BOBP-IGO, COBSEA, the WWF's Coral Triangle Programme, and the Arafura-Timor Sea Action Plan – were outlined.

Session 3 discussed **"certification in fisheries and aquaculture"** and recalled the September 2007 workshop on the subject held in Ho Chi Minh city, Viet Nam.
Mr Miao Weimin of the APFIC Secretariat said there's no magic formula to determine whether particular products or fisheries warrant certification initiatives. Cost-benefit generalizations were not advisable. He made suggestions for a cost-benefit analysis using a simple decision tree. Mr Pham Trong Yen from Viet Nam said certification schemes should be - considered not just for South-North trade but also for South-South trade.
Mr Sena De Silva of the NACA Secretariat referred to the work being done by FAO and NACA for two years on guidelines for aquaculture certification. The final draft of FAO guidelines on the subject would be presented to the fourth meeting of COFI-AQ on 6-10 October, 2008, in Puerta Varas, Chile.

Session 4 was devoted to **"Country initiatives in combating IUU fishing and capacity management and promoting certification in fisheries and aquaculture".**
Australia, Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Republic of Korea, Sri Lanka, Thailand and Viet Nam outlined national efforts and challenges. Some of the questions raised during discussion related to mitigating the impacts of climate change; the rising costs of fuel; the use of new technologies to manage fisheries; and promotion of South-South cooperation.

The session chairperson said it could not be assumed that joining certification schemes would automatically mean more benefits for producers, but it might improve market access in some areas. He urged that schemes being developed by member-countries should be in accordance with FAO guidelines. The chairperson appreciated the 'increased openness' between countries on IUU fishing.

Session 5 focused on **"Regional Policy Issues** and the **Code of Conduct for Responsible Fisheries".** Ms Gabriella Bianchi of the FAO reported on a 2008 workshop held in Bangkok on assessment and management of offshore resources in South and Southeast Asia. She said that these countries had policies to promote and expand fishing farther offshore from their coasts. There was concern that the policy could backfire if not managed effectively. The workshop believed that the offshore resources were rather limited, and in the case of oceanic tuna, already heavily exploited. Several technological, social and ecological constraints made offshore fishing a high-risk undertaking. The workshop recommended a precautionary approach to offshore fishing in South and Southeast Asia, starting with in-depth economic feasibility studies and risk assessments.

Discussing "Marine protected areas (MPAs) and fisheries management – the human dimension,"
Ms Ramya Rajagopalan of the International Collective in Support of Fish Workers (ICSF), Chennai, said MPAs ranged from 'no-take' to 'multiple-use' zones. She said ICSF had examined six case-studies (from India, Thailand, Africa and Latin America) to look at ways in which livelihood concerns were incorporated into MPAs. The case studies showed loss of livelihoods, ineffective processes, dominance of natural science and neglect of social science, ineffective implementation of legislation, and poor flow-back of economic and social benefits to communities. The speaker urged a human rights approach to MPAs. Replying to a question, she said MPAs were often designed by environmental ministries for environmental reasons without considering social objectives.

Discussing "Global drivers and their implications for Southeast Asian fisheries," Mr Steven Hall, Director-General of the WorldFish Center, said the most obvious drivers were trade and markets. Global climate and environment were other major drivers. Many studies had been carried out about the impact on resources, but few about the impact on communities. A vulnerability map showed Africa

The APFIC Consultative Forum Meeting in progress.

and sub-saharan Africa to be the most vulnerable to climate change, while large impacts were also felt in Asia.

Other presentations during the session were on "Fisheries assessments – a tool for management?", "Promoting long-term sustainable management of marine fisheries by addressing illegal, unreported and unregulated fishing – issues and challenges for the APFIC region", "Adapting to challenges – water development and inland fisheries," "Aquaculture developments in the Asian region and associated issues that need attention."

Session 6 highlighted "**New areas of APFIC's work**". Dr Derek Staples, FAO-APFIC Consultant, focused on implementation of the Code of Conduct for Responsible Fisheries through the Ecosystem Approach. The speaker said that the ecosystem approach – recommended by the World Summit on Sustainable Development held in 2002 — could be defined as "a strategy for the integrated management of land, water and living resources that promoted conservation and sustainable use in an equitable way". In a fisheries context, the ecosystem approach to fisheries emphasizes the management of all the major components in an ecosystem, including associated species, habitats and vulnerable species, and also the social and economic benefits that can be derived from harvesting fish.

Mr Richard Gregory, FAO-APFIC Consultant, made a presentation on "Reducing vulnerability and improving fisheries livelihoods of coastal communities". He said many fishing communities were caught in a poverty trap. A declining resource base demanded more fishing and increased costs – which drove them deeper into poverty. Finding alternative livelihoods for these people was not easy, since most of them had limited access to land, capital or assets.

Bunaken National Marine Park, Manado

He said livelihood alternatives could be within a community or outside it, and either extractive or non-extractive. Aquaculture was an extractive option within the community. But it had negative impacts – it could suppress the local price of fish, and sustainability was questionable. Improving market opportunities would be useful, but this was difficult in remote areas.

Non-extractive options such as tourism might not benefit many fishers. At best, fishers could be hired to man tourist boats. Small shops needed business skills. Handicrafts and village industries were an option; access to capital and credit posed problems.

It is time to face up to some truths, Mr Gregory said. Many coastal fishers didn't want their children to take up their occupation. Governments had a responsibility to assist fishers to diversify. The next generation would need education and skill training and discover new opportunities and options.

Summary and Recommendations

The Forum felt that significant advances had been made in reforming fisheries, but there was need for more effective management. Aquaculture offered opportunities, but its performance had to improve.

The Forum said progress had been made in reducing low-value/trash fish production, reducing trawl sector capacity, improving value addition and improving fish handling and utilization. But production of low-value/trash fish continued to be significant, and this raised concerns about the growth overfishing.

The Forum emphasized that co-management approaches should be mainstreamed into fisheries management, Feedback from member-countries showed that this was happening. Co-management approaches differed across countries: the common feature was better dialogue on decision-making between fisheries agencies, fishers and fish farmers.

The forum recommended that APFIC should continue to facilitate information sharing between regional organizations on key issues relating to fisheries and aquaculture. APFIC should monitor recent changes in member-countries' policies – specifically, developments relating to IUU fishing, managing fishing capacity, certification, co-management and low value/trash fish.

The Forum identified a dozen tasks for implementation, including the following:

- review how fisheries and aquaculture can adapt or even benefit from climate change;
- evaluate the benefits (human and environmental) of MPAs and their trade-offs;
- assess the impact of subsidies on fisheries and aquaculture in the region and the effect of their removal;
- identify positive and negative impacts of reducing fishing overcapacity;
- promote harmonization of food standards and certification systems for member-countries;
- develop regional cooperation to manage fishing capacity and combat IUU fishing;
- report on changing markets and trade in the region, in particular the effects of FTAs, economic integration and the WTO;
- review the implications of increasing fuel and feed prices on the sector; and
- plan for water development with minimal negative impact on inland fisheries.

Developing Guidelines for Safety at Sea: Expert Consultation in Rome Provides Guidance

Safety at sea is a critical issue in fisheries. Governments need help in providing guidelines to improve safety.

An expert consultation in Rome held from 10 to 13 November, 2008, did just that – it came up with an outline for the development of guidelines for best practices to improve safety at sea.

The Consultation was funded by NIOSH (National Institute of Occupational Safety and Health) through the BOBP-IGO, and the Government of Norway through the FAO FishCode Programme. Sixteen persons took part in the Consultation.

Welcoming participants, Mr Grimur Valdimarsson, Director of the Fish Products and Industry Division, FAO Rome, said that more than 24 000 fishing-related deaths occurred every year. He said that in merchant vessels, a majority of the hazardous operations were carried out in the safety of a port; but in small fishing vessels, crews worked at sea in all types of weather. He said that human error rather than faulty design, construction or equipment of vessels, was responsible for about 80 percent of the accidents.

Mr Jeremy Turner, chief of the FAO's Fishing Technology Service, ascribed fatalities in fisheries to poor-quality vessels and equipment as well as to human failure. Regulation could address the former issue, a broader range of interventions was needed to eliminate the latter. Economic pressures made owners and skippers resort to cost-cutting on vessel maintenance, safety equipment, labour and working conditions. These contributed greatly to human error and accidents. Holistic solutions were needed that addressed social, economic and technical dimensions.

The resource person from the IMO, Mr Hiroyuki Yamada, said that the long-standing cooperation between FAO, ILO and IMO had yielded a range of instruments related to the safety of fishers and fishing vessels. Collaboration focused currently on safety recommendations for decked fishing vessels less than 12 m long, and undecked fishing vessels, as well as on guidelines to assist the implementation of the FAO/ILO/IMO Code of Safety.

Dr Jennifer Lincoln (an injury epidemiologist with NIOSH) summarized a paper based on a FAO/NIOSH study on the relationship between fisheries management and safety at sea. Sixteen case studies from around the world were part of the study. The Consultation stressed the need for a shared understanding between fisheries managers and safety professionals, and urged them to work together.

The Consultation recognized the special needs of developing countries in implementing guidelines for safety at sea. To remove constraints to a safety policy, technical and legal assistance might be needed; also assistance in the areas of data collection and analysis, capacity-building, scientific cooperation, and

A view of the city of Rome from FAO Headquarters.

the training of trainers and extension workers. The Consultation noted that special attention might have to be paid to available and affordable safety equipment and servicing facilities.

Outline for guidelines on best practices for safety at sea

The outline for the development of guidelines was based on four interlinked 'pillars'. Under the first pillar, a baseline assessment of safety issues is proposed through data collection and analysis of accidents in fisheries.

The second pillar is devoted to creating an inventory or baseline survey that provides a comprehensive overview of all aspects of national fisheries.

In the third pillar, information provided under pillars 1 and 2 is to be analysed to identify safety problems and their causes. This analysis would be used to develop solutions and measures for mitigation. The fourth pillar would concentrate on implementation and promotion of the strategy. It includes recommendations on how to advocate, manage and influence change and evaluate progress.

Here are important points from the four pillars. For complete details, please see FAO Fisheries and Aquaculture Report No 888 (Report of the Expert Consultation on best practices for safety at sea in the fisheries sector)

Pillar 1 – Data collection and analysis to improve safety

Guidance will be provided on:

- The need for accident/incident data collection, interpretation and analysis,
- Design of data collection systems (Data sources may include records held by the Coast Guard, the Navy, insurance companies, traditional power structures, police, death registers and coroners' inquests, as well as anecdotal evidence from crew members, communities and families),

CHAIRPERSON
SECRETARY

Participants at the Expert Consultation.

- Preparation of a standard form for accident data collection,
- Systems for centralized collection of data from decentralized sources,
- Collection of accident and injury data in remote areas,
- Collection of accident and injury data from confidential sources, and
- Comparing costs of accident prevention versus search and rescue operations.

Pillar 2 – National fisheries sector inventory

- Comprehensive reports reviewing all national fisheries,
- Numbers of people involved in fisheries, numbers and types of fishing vessels as well as non-fishing vessels dedicated to supporting activities in fisheries,
- Socio-economic analysis of fisher communities and fleet segments,
- A summary of national fisheries management objectives and regulations,
- Definition of links between all concerned administrations,
- Identification of vessel owners, and organizations concerned with fish processing and marketing and fisher representatives,
- Training facilities in fisheries, numbers of qualified trainers and extension specialists,
- Availability of qualified examiners in areas of certification of fishing vessel personnel,
- Legal requirements for consultation/cooperation between ministries and administrations,
- Status of existing national legislation directly or indirectly related to fishing vessel safety,
- Identification of procedures and conditions for licensing and registration,
- Identification of construction standards for fishing vessels and certification requirements,
- Identification of manufacturers and suppliers within the country providing safety equipment, machinery and services,
- Lists of insurance brokers, and
- Historic data on fatalities and injuries.

Pillar 3 – Problems, solutions and safety strategy development

Analytical tools

A strategy for improved safety and guidance, including the use of analytical tools, should determine direct contributing factors to fatalities, injuries and vessel casualties before, after and during the event, such as:

- Human factors (fatigue, stress, lack of training, risk-taking behaviour, drug abuse, safety culture),
- Fisheries management regimes (overcapacity, excessive competition),
- Regulatory measures (unclear, inappropriate or out-of-date regulations, gaps or contradictions

among applicable regulations, particularly regarding registration and fishing authorization procedures),

- Vessel and equipment (poor design and construction, inadequate crew facilities and medical supplies, poor maintenance, lack of quality boatbuilders),
- Physical environment (weather, wind, waves, poor visibility, etc), and
- Operational factors, including vessel management, aids to navigation, navigational error.

Strategy development

For mitigation or solution of identified problems, guidance should be provided on the development of strategies, participatory mechanisms and implementation programmes, including elements such as:

- A mechanism to ensure broad stakeholder consultation and participation (which may include fish processing and marketing companies, safety equipment and engine suppliers, boatyards, scientific research and training institutes,
- Analysis of the value of existing legislation, preparation of amendments to existing legislation or new legislation,
- Implementation of training needs assessment and voluntary and mandatory training for fishers and inspectors as well as fisheries and maritime administration personnel,
- Analysis of direct and indirect relationship between fisheries management measures and safety at sea,
- Evaluation of factors arising from increased investment, effort and risk,
- The significance of fiscal policies and their effect on safety,
- Development of an effective framework for cooperation between fisheries and maritime and other concerned administrations at the national level,
- Importance of awareness-raising campaigns on safety among fisher communities, and empowerment of fishers in the decision-making process through the participatory approach, and
- Early warning systems, disaster preparedness, risk reduction planning and implementation and other mitigation arrangements.

Pillar 4 – Managing Change

Drawing upon the data collection and analysis, inventories and problems, and the solutions identified, Pillar 4 will seek to promote an overall strategy on how to manage or influence change. Plans of action with measurable goals and objectives to monitor progress and evaluate impact will be developed. Guidance will be provided on the need -

- To raise political will and commitment for improving safety,
- To identify pressure groups to bring about change,
- To empower all stakeholders to take identified action, and where applicable, the formation of a safety committee (fisheries and maritime administrations, training institutions, fishing boat owners and operators, fisher unions, cooperatives, families, insurance entities),
- To consider the value of formal classroom and informal training,
- For consultation among all stakeholders, the objective being that people in fisheries take on the onus for best practices to improve health and safety,
- To provide the resources to bring about change, including skills, expertise, time and financing to ensure change through action, performance and accountability,
- For quality project design and formulation, including progress indicators, and addressing implementation, ongoing monitoring and evaluation, and correction and adjustment,
- For the development of a communication strategy, for distribution of all pertinent information and awareness-raising, and
- To use mentors to enhance communication with fishers.

The Consultation has asked the FAO Secretariat to proceed with the development of guidelines on the basis of the outlines summarized above. Experts present at the Consultation will be involved in the effort. Expertise in the ILO and IMO secretariats will be tapped.

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Jim Sandkvist *Akihiko Matsuda* *Nigel Campbell* *G J Garrido* *Lubna Al-Kharusi*

Ari Gudmundsson *Michel Blanc* *Brandt Wagner* *Yugraj Yadava* *Robert Lee*

Participants of the Expert Consultation.

Thinadhoo Island, Maldives

Text and Photographs by
Y S Yadava

Maldives is an archipelago of 1 190 low-lying coral islands grouped into 26 atolls. The country has an area less than 300 sq. km and a total coastline of 644 kilometers. Some 200 islands are inhabited. The population of the Maldives (July 2000) was estimated at about 320 000. Only five islands have a population more than 3 000.

Thinadhoo (Gaafu Dhaalu atoll) is one of the most highly populated islands in the southern part of the Maldives, and an economic hub of the area, with an airport close by. Its area: 58.10 ha; Population: 6 376.

A BOBP-IGO-NIOSH mission – Dr George A Conway, Director, Alaska Centre of the National Institute for Occupational Safety and Health, USA, Ms Elizabeth Conway, Research Assistant and Dr Y S Yadava – visited Thinadhoo July 17-19, 2008. Objective: To assess safety-at sea requirements of fishers in the southern islands of the Maldives as well as the accident reporting system in fisheries. Mr Ahmed Rashid, Fisheries Research Officer, accompanied the mission.

Island chief Nasir Ahmed gave the mission a brief tour. They saw the newly-constructed ice plant and the fish market (both being post-tsunami initiatives) and the boatbuilding industry. Boats being built ranged in length from 100 to 120 feet. The mission also visited the Thinadhoo hospital.

At a stakeholder meeting organized in the evening, a large group of local fishers took part and told the mission about their needs and problems. Thinadhoo has some 400 active fishers. The main species caught? "Tuna, tuna and tuna", said a fisherman. All the fishers engage in pole and line tuna fishing, mainly in the atolls. "Fish stocks seem to be going down every year," one fisher grumbled. "We have to travel long distances for bait fishing. Our cost of operations is going up."

The fishers do not regard fishing as a hazardous occupation. In fact, no major fishing-related accident has been reported in more than two decades (except the March 2004 incident, when a boat carrying 126 passengers capsized, killing 21). One reason could be that the fishers operate only within the atolls and in clear weather – they do not fish when conditions turn rough.

Injuries are sometimes caused by hooks. One fisher even lost an eye. Many fishers have now started wearing helmets to protect faces and eyes. They dive deep to catch tuna bait. (Scuba tanks have replaced the once-popular 'hookahs' or surface lines). Sometimes they are victims of decompression sickness. Eye problems are common due to prolonged exposure to bright sunlight.

As for safety equipment, the fishers carry satellite phones, GPS and SSB radios, besides life jackets and life belts. They are adroit swimmers and skilled navigators and claim a bit of mechanical aptitude as well – they can attend to minor repairs themselves.

The fishers complained about indiscriminate boatbuilding in the Island – neither any quality control nor inspection. New boats constructed are stretched models of older versions, with no modification in structural design. Recently, a 120 ft fishing boat broke into two – it had been stretched too far. The fishers are not insured, but they plan to go in for insurance.

The photographs on this and the facing page provide glimpses into Thinadhoo Island, and into the lifestyle and work style of the fishers.

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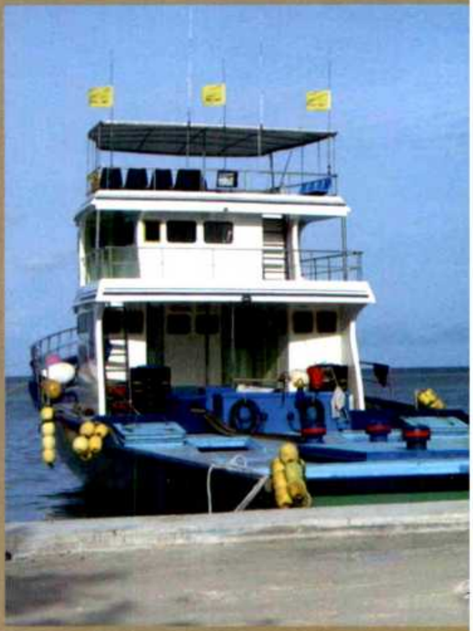
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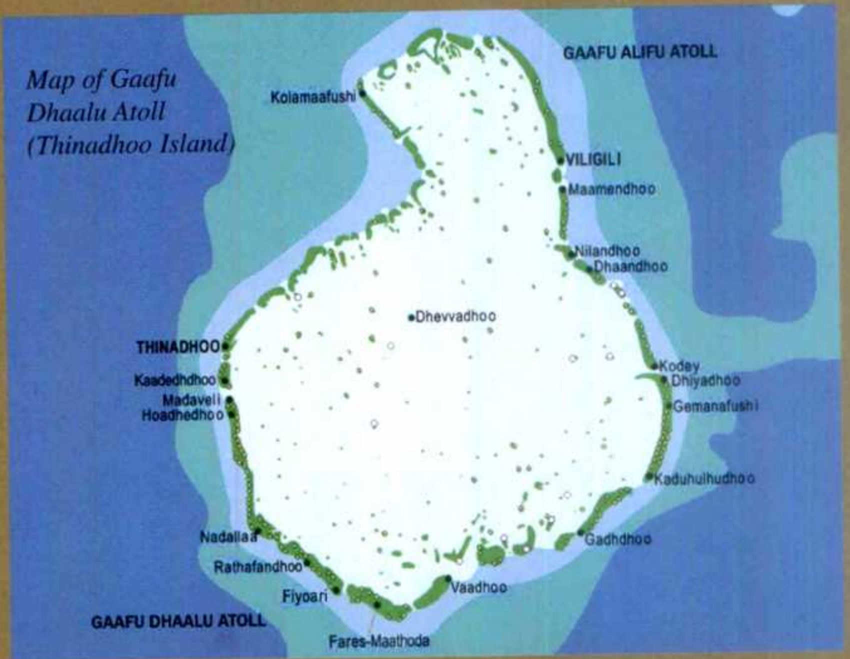
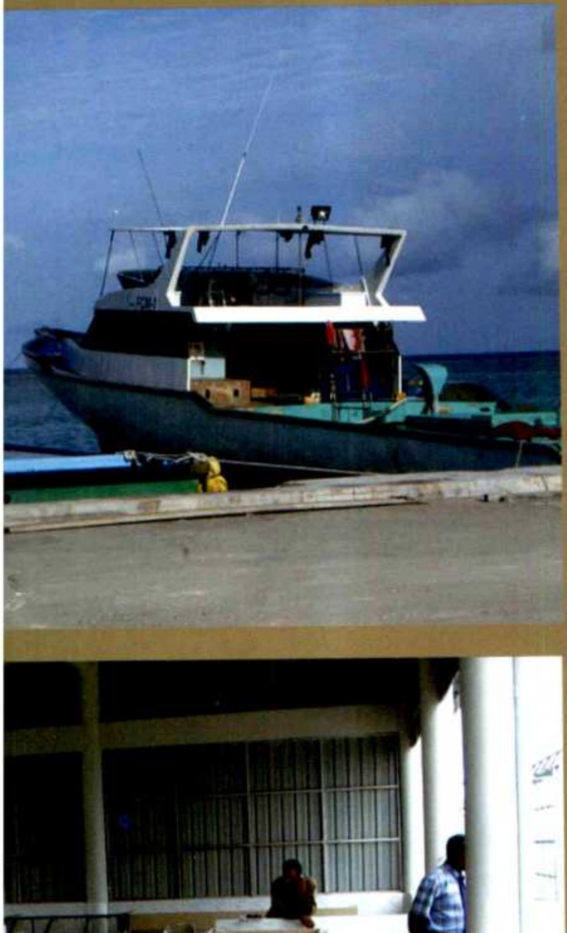
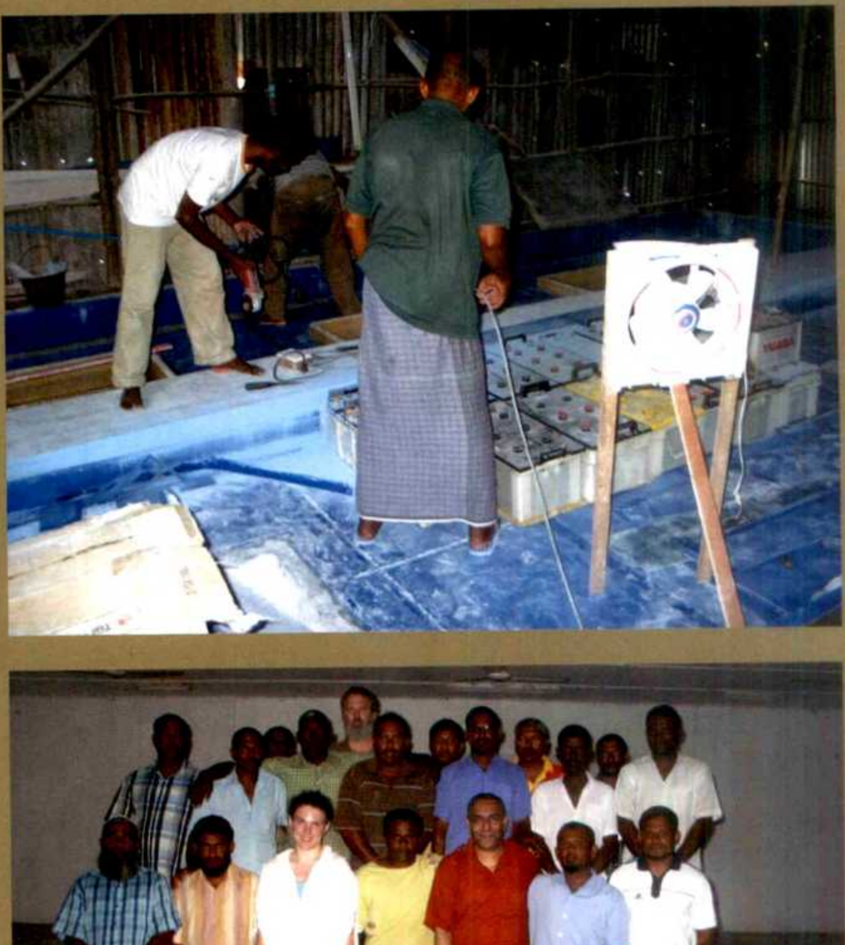

Map of Gaafu Dhaalu Atoll (Thinadhoo Island)
GAAFU ALIFU ATOLL
Kolamaafushi
VILIGILI
Maamendhoo
Nilandhoo
Dhaandhoo
Dhevvadhoo
THINADHOO
Kaadedhdhoo
Madaveli
Hoadhedhoo
Kodey
Dhiyadhoo
Gemanafushi
Kaduhulhudhoo
Nadallaa
Gadhdhoo
Rathafandhoo
Vaadhoo
Fiyoari
GAAFU DHAALU ATOLL
Fares-Maathoda





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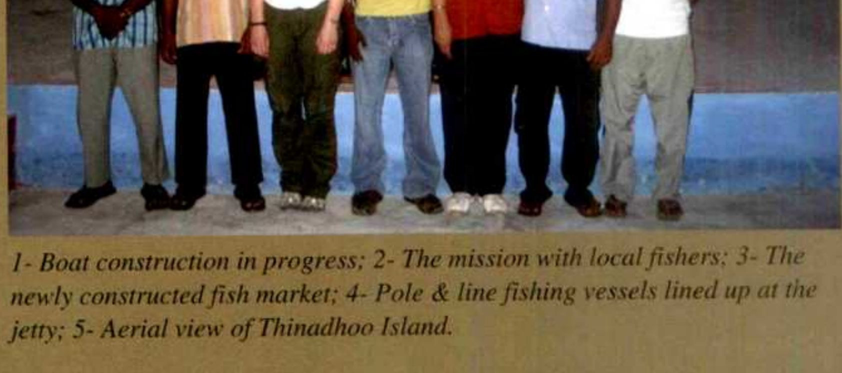

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1- Boat construction in progress; 2- The mission with local fishers; 3- The newly constructed fish market; 4- Pole & line fishing vessels lined up at the jetty; 5- Aerial view of Thinadhoo Island.

Impacts of Climate Change on Coastal and Marine Fisheries Resources in Bangladesh*

Bangladesh has an area of 147 570 sq. km and a population of 156 million. It is bordered by India and Myanmar, with the Bay of Bengal and the North Indian Ocean to the south and the Himalayas to the north.

Climatically, Bangladesh is one of the world's most vulnerable countries (Table 1). Frequent natural disasters such as cyclones cause loss of life and damage to infrastructure, economic assets, and livelihoods. Much of the country is routinely inundated during the summer monsoon. High population density and poverty aggravate the vulnerability. The population of Bangladesh may swell to over 200 million by 2050 (WB and BCAS 1998).

Climate change is a long-term phenomenon. Scenarios for 2030 and 2050 for Bangladesh have been developed under the United States Country Study Program, also by the World Bank (Table 2).

According to IPCC (2001), the following changes related to the Bay of Bengal have been observed in Bangladesh in the form of climate trends, variability and extreme events:

- Average temperature has registered an increasing trend of about 1°C in May and 0.5°C in November during the 14 -year period from 1985 to 1998.
- The annual mean rainfall has been increasing and decadal rain anomalies have exceeded the long-term average since 1960s.
- Serious and recurring floods have taken place during 2002, 2003 and 2004. Cyclones originating from the Bay of Bengal have been noted to decrease since 1970 but the intensity has increased.
- Frequency of monsoon depressions and cyclone formation in the Bay of Bengal has increased.
- Salt water from the Bay of Bengal is reported to have penetrated 100 km or more inland along tributary channels during the dry season.

The coastal and marine environment of Bangladesh

The Bay of Bengal, the marine area of Bangladesh, is characterized by a semi-enclosed tropical basin. The coastline of the country comprises about 710 km extending from the tip of Teknaf in the south-east to the south-west coast of Satkhira (Fig.1). As a result, an area more than 166 000 km^2 along a 710 km coastline comes under the economic jurisdiction of Bangladesh for exploration, exploitation, conservation and management of its marine resources.

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Climate vulnerability

El Niño and La Nina

Some studies report that the *El Niño* Southern Oscillation events influenced the record-breaking floods of 1987, 1988 and 1998 (Chowdhury, 1998).

The rapid transformation of *La Nina* from the *El Niño* phase of early 1998 is said to have influenced high rates of precipitation over the entire GBM catchment basin. As a result, a prolonged dry season was followed by the wettest monsoon – eventually leading to the deluge of the century. Global events can therefore have ominous local weather effects.

Flooding

Analysis of past floods suggests that, about 26 percent of Bangladesh is subject to annual flooding. An additional 42 percent is at risk of flood with varied intensity (Ahmed and Mirza, 2000). A 10 percent increase in monsoon precipitation in Bangladesh could increase runoff depth by 18 to 22 percent, resulting in a seven fold increase in the probability of an extremely wet year (Qureshi and Hobbie, 1994).

Cyclones and storm surges

A tropical cyclone hits Bangladesh, on an average, every three years. These storms generally form in the months just before and after the monsoon and intensify as they move north over the warm waters of the Bay of Bengal. Storm surges are higher in Bangladesh than in neighboring countries because the Bay of Bengal narrows towards the north, where Bangladesh is located. In recent years, general cyclonic activity in the Bay of Bengal has become more frequent, making the seas rougher and making life difficult for fishermen and making small craft difficult to use.

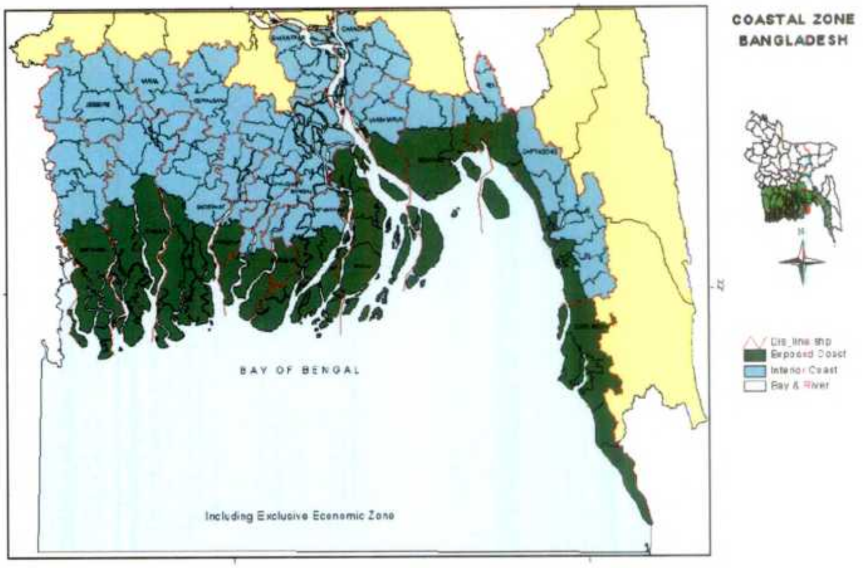

Figure 1. Coastal zone of Bangladesh

Table 1. Major climate-vulnerable countries (Deaths/100 000 people exposed to floods or cyclones)

Floods			Tropical cyclones		
1	Venezuela	4.9	1	Bangladesh	32.1
2	Afghanistan	4.3	2	India	20.2
3	Pakistan	2.2	3	Philippines	8.3
4	China	1.4	4	Honduras	7.3
5	India	1.2	5	Vietnam	5.5
6	Bangladesh	1.1	6	China	2.8

Source: UNDP (2004)

Table 2. Climate change scenarios for Bangladesh in 2030 and 2050

Year	SLR (cm)	Temperature increase (°C)	Precipitation fluctuation compared to 1990 (%)	Changes in evaporation
2030	30	+0.7 in monsoon +1.3 in winter	-3 in winter +11 in monsoon	+0.9 in winter +15.8 in monsoon
2050	50	+1.1 in monsoon +1.8 in winter	-37 in winter +28 in monsoon	0 in winter 16.7 in monsoon

Source: UNFCCC (2002)

Sea level rise in Bangladesh

Another critical variable that determines the vulnerability of Bangladesh to climate change impact is the magnitude of sea level rise.

Impact on fisheries and aquaculture

Sea level rise and consequent changes to the river estuary can trigger changes in fish habitat and breeding ground. Penaeid prawns breed and develop in brackish water, where salt water and fresh water mixes. Sea level rise would turn this interface backward, changing the natural habitat of the prawn population. There are some 60 shrimp hatcheries and 120 shrimp processing plants in the coastal zone of Bangladesh. The hatcheries are located along the sea beach at Cox's Bazar. Favourable environmental condition and brood stock availability are the main reasons to set up hatcheries in that area. Some hatcheries have also started trial and experimental production in Chittagong and Satkhira coast. These districts are located in coastal zones vulnerable to sea level rise – making the shrimp hatcheries and shrimp fields vulnerable as well.

Sea level rise helps shrimp farming in one way – by introducing salinity in the coastal area. But flooding caused by sea level rise can inundate shrimp ponds and destroy this prospective foreign exchange earner. It can also affect the dry fish industry.

Table 4. Marine fish production (MT) in Bangladesh

Year	Industrial	Artisanal	Total
1997-1998	15 273 (5.60)	257 545 (94.40)	272 818
1998-1999	15 818 (5.11)	293 979 (94.89)	309 797
1999-2000	16 304 (4.88)	317 495 (95.12)	333 799
2000-2001	23 901 (6.30)	344 596 (93.70)	379 497
2001-2002	25 165 (6.06)	390 255 (93.94)	415 420
2002-2003	27 954 (6.47)	403 954 (93.53)	431 908
2003-2004	32 606 (7.16)	422 601 (92.84)	455 207
2004-2005	34 114 (7.18)	440 483 (92.81)	474 597
2005-2006	34 084 (7.10)	445 726 (92.90)	479 810
2006-2007	35 391 (7.26)	452 047 (92.74)	487 438
Average	26 061 (6.30)	376 868 (93.70)	404 029

** The figures in parenthesis indicate percent of total*

Climate change and the Sundarbans ecosystem

On the basis of different vulnerability indicators for accelerated sea level rise, the Woods Hole Oceanographic

Institute (WHOI), 1986 produced a list of 27 low-lying countries. The list was headed by Bangladesh. The Bay of Bengal acts as a funnel for storm events, creating severe storm surges. These can raise sea level above tidal height and devastate a low-lying coast like that of Bangladesh.

The Sundarbans can be wiped out by a 1- metre rise in sea level (World Bank, 2000). Loss of the Sundarbans would be catastrophic – a loss of heritage, of biodiversity, of fisheries resources, of life and livelihoods and of a very high productive ecosystem.

Sea level rise can decrease availability of light for corals and thereby their growth. It can destroy St. Martin's island, the only highly productive coral island of Bangladesh.

Climate change impacts on marine fisheries resources

Alteration of marine ecosystems due to climate change has both direct and indirect effects on fish – their reproduction, migration and survival.

Hilsa (*Tenualosa ilisha*) is the national fish of Bangladesh. It accounts for 13-14 percent (valued at around Tk 6 000 million, 1.3 % of GDP) of the total fish production of Bangladesh. During the last two decades hilsa production from inland waters declined about 20 percent, whereas marine water yield increased threefold. Major hilsa catch has gradually shifted from inland to marine waters.

Recent studies reveal that the availability of hilsa is gradually declining in the Padma and Meghna river catchment areas. Result: hilsa production in the rivers has been going down, while that in marine waters has been going up. Similar conditions might occur for other marine fish/shrimp species, but no study has yet been carried out in Bangladesh.

Combating climate changes

In 2005, the Government of Bangladesh launched its National Adaptation Programme of Action (NAPA), in partnership with other stakeholders. It identified adaptation needs to combat the effects of climate change. The Climate Change Cell in the Department of Environment supports the mainstreaming of climate change into national development planning.

Adaptation measures in fisheries as prioritized in Bangladesh NAPA

- Promoting adaptation to coastal fisheries through culture of salt tolerant fish, especially in coastal areas of Bangladesh.
- Adaptation to fisheries in areas prone to enhanced flooding in North East and Central Region through adaptive and diversified fish culture practices.
- Reduction of climate change hazards through coastal forestation with community focus.

Adaptation options for climate changes

Adaptation seeks to reduce the adverse effects of sea level rise on living organisms, including human and the environment. The ability to adapt and cope is a function of wealth/income, technology, scientific and technical knowledge and skills, information, infrastructure, policy and management institutions and equity.

Sea level rise adaptation can be addressed by changes in policies that lessen pressure on resources, improve management of environmental risks, and enhance adaptive capacity. As most of the populations of the coastal communities of Bangladesh are fishermen and farmers, the adaptation options should focus on these two sectors. If we can implement various adaptation options for coastal fisheries, as shown in the following Causal Loop Diagram (CLD) (see Fig. 2 on page 38), we find that five loops may reinforce to increase the fisheries production. Foreign exchange earned by coastal fisheries could be re-invested to develop the sector.

Coastal communities should be prepared to combat climate change through disaster preparedness activities. A disaster calendar should be prepared for the communities, so that they can safely practise fish farming. Example: most cyclones in the coastal zone occur in October and May. Coastal district Noakhali as well as Khulna, Satkhira and Patuakhali districts should be covered by the proposed calendar. Fishermen should avoid these districts for fishing and fish farming during specified periods.

Weather forecasts on Bangladesh radio and television are usually delivered in an academic or literary style, not suitable for coastal farmers and fishermen. Target groups should be able to understand and react to forecasts. Local radio stations should broadcast special programmes on issues relating to sea level rise.

Research should be conducted to identify salinity-tolerant species in coastal fisheries. Species selection should be made for low, moderate and high saline environment. After selecting different species for different zones or saline environments, fishermen should be trained in breeding and seed production techniques including cultivation and harvesting of the species.

Future climate change strategy and action plan

The Government of Bangladesh is committed to strengthen the country's resilience to climate change, reduce risks posed to national development; and development of the country along a low-carbon growth path. The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) is a 10-year programme (2009-2018) to build the capacity and resilience of the country to meet the challenge of climate change (see box on page 39). It has been developed through a participatory process involving various ministries and agencies, research organizations and the business community.

Role of Bangladesh Fisheries Research Institute

The Bangladesh Fisheries Research Institute (BFRI) is at the primary stage of a climate change study. BFRI has a long-term study programme on hilsa fishery in Bangladesh. Recently, a programme was initiated on the impact of climate change on the maturity and spawning of hilsa in relation to habitat degradation. Another technical support programme is going on – to identify and analyze sound fisheries and aquaculture risk adaptation options in drought-prone areas of North West and coastal areas of South West Bangladesh.

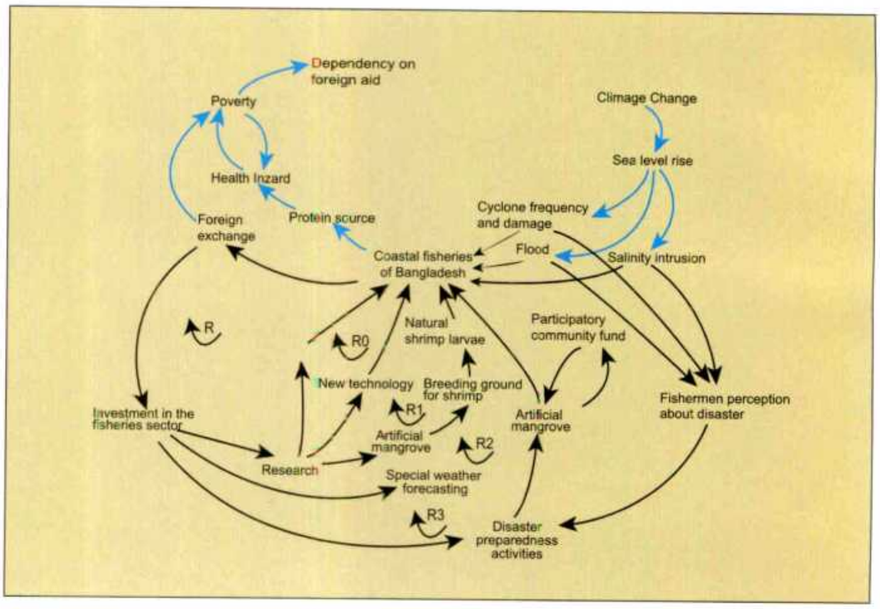
Dependency on foreign aid
Poverty
Climage Change
Sea level rise
Health Inzard
Cyclone frequency and damage
Foreign exchange
Protein scurce
Coastal fisheries of Bangladesh
Flood
Salinity intrusion
R
R0
Natural shrimp larvae
Participatory community fund
New technology
Breeding ground for shrimp
R1
Investment in the fisheries sector
Artificial mangrove
Artificial mangrove
R2
Fishermen perception about disaster
Research
Special weather forecasting
R3
Disaster preparedness activities

Figure 2. Causal Loop Diagram for adaptation options of coastal fisheries with sea level rise (Sarwar, 2005).

BFRI should in future heighten its focus on climate change impact on fisheries; it should in particular strengthen research as well as survey and monitoring capacity in marine fisheries – which is presently weak because of absence of infrastructure (vessel) and technical manpower. The Department of Fisheries is trying to obtain a research vessel for BFRI through the OIC-supported Marine Capacity Building Project.

Conclusions

Climate change impact in Bangladesh is high, though the country's greenhouse gas emissions are low. The government needs to pay keen attention to issues related to climate change impact, organize research, develop salinity-tolerant species in both agriculture and fisheries, and develop a strategy to combat impact. Adaptation costs should be recovered from coastal resources using economic instruments.

Research is also needed to preserve the country's biodiversity. Technical and financial assistance from the international community is essential.

The main climate change impacts on the marine environment are rise in sea water temperature, salinity and sea level, drop in sea surface pH, and changes in upwelling and water mass movement, and the behaviour of *El Niño* and *La Nina*.

Climate change would affect the distribution and abundance of marine fish species. Many fish species have a narrow range of optimum temperatures related both to their basic metabolism and the availability of food organisms. Depending on the species, the area it occupies may expand, shrink or be relocated. No specific research has yet been conducted in these issues in Bangladesh and countries. A coordinated long-term research project on the impact of climate change on marine resources in the Asia-Pacific region is an urgent need.

BCCSAP of Bangladesh concerning fisheries and biodiversity

Programme and time-frame	Justification	Specific actions
The development of adaptation strategies in the fisheries sector (mid to long-term)	Climate change is likely to adversely affect freshwater and marine fisheries resources in Bangladesh. For example: the spawning of freshwater and marine species may be affected. Water temperatures in fresh, brackish and marine waters may go up. Saline waters may extend further inland in the south of the country. This will alter existing aquatic ecosystems and production of fish. There may be turbulent weather along the coast for longer periods, impacting on the livelihoods of fishermen. These potential impacts must be identified and researched and management strategies developed, tested and made ready, in anticipation of climate-related changes.	• Assess potential threats to fish spawning and growth of fish in the freshwater fisheries sector and develop adaptive measures, including fish farming and river-based cage aquaculture, etc. • Assess potential threats to fish spawning and growth of fish in the coastal zone and brackish water and develop appropriate adaptive measures and mariculture practices. • Assess potential impacts on the shrimp sector and develop appropriate adaptive measures and cultural practices. • Assess potential threats to the marine fish sector and develop adaptive measures to protect these resources
Monitoring of ecosystem and biodiversity changes and their impacts (mid to long-term)	One of the objectives of the UNFCCC is to urgently reduce green house gas emissions, so that ecosystems and their flora and fauna have time to adjust to climate change. Salinity levels are also likely to increase significantly in the coastal belt. Mangrove ecosystems, which are already under serious stress for anthropogenic reasons will suffer heavily due to further increases in salinity. These could alter the entire ecosystem of the Sundarbans and cause the extinction of some valuable fish/shrimp and other aquatic species. In view of these expected changes, a systematic monitoring mechanism should be put in place to assess the impact of climate change on ecosystems and bio-diversity. A participatory impact monitoring mechanism involving communities and experts will be designed. Pertinent physical, chemical and biological data will be collected. Changes that take place in livelihood patterns due to ecological and biodiversity changes will be assessed and policy recommendations and appropriate actions suggested.	• Set up a well-designed monitoring system to evaluate changes in ecosystem and biodiversity, covering all important and sensitive ecosystems. • Develop participatory monitoring systems by involving trained people such as school teachers, communities and academic researchers. • Report changes in ecosystems and biodiversity and assess the implications, including those for the livelihoods of local people, and recommend adaptation measures.

Source: MOEF (2008)

Further reading:

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Andreas Westerberg, a profile

Andreas Westerberg, 33, joined the BOBP-IGO in Chennai as Fishery Officer in FAO's Global Project on Safety at Sea for Small-Scale Fisheries in Developing Countries (South Asia) in late 2008. The assignment is till June 2009.

Andreas hails from Linköping, Östergötland, Sweden, where he served as a Project Coordinator for the Swedish Maritime Administration (SMA). An economist, Andreas also holds a post-graduate degree in Maritime Affairs from the World Maritime University, Malmö, and in Business Administration from the University of Gothenburg. He is also an able seaman trained in Crowd Management, Small Pleasure Craft Driving and VHF operation.

Andreas is enjoying his first overseas assignment – exploring local culture, experimenting with local cuisine, and helping out a children's NGO. He is a linguist (proficient in Swedish, English, Spanish, French and Portuguese) and a competent photographer. He talked with Bay of Bengal News about his life and career.

Q: What were your duties at the Swedish Maritime Administration?

A: I worked with a project to offer a Search and Rescue (SAR) Mission Coordination Course for Estonia. I also assisted the SAR unit at the SMA and the Marine Rescue Coordination Centre. I was responsible for collecting SAR-related information, project planning, monitoring and implementation.

Q: Please elaborate on your safety-at-sea related experiences.

A: A major goal of the SMA is to provide sustainable transportation nationwide. Safe shipping for trading and fishing vessels is an integral component of sustainability. All our projects, including those I planned and implemented, aimed at enhancing safety at sea. Earlier, I helped prepare a report on "Survey of strategic Swedish ports" for the government. This work provided exposure to maritime governance in Sweden and inter-agency responsibility sharing, which I hope will prove useful in this project.

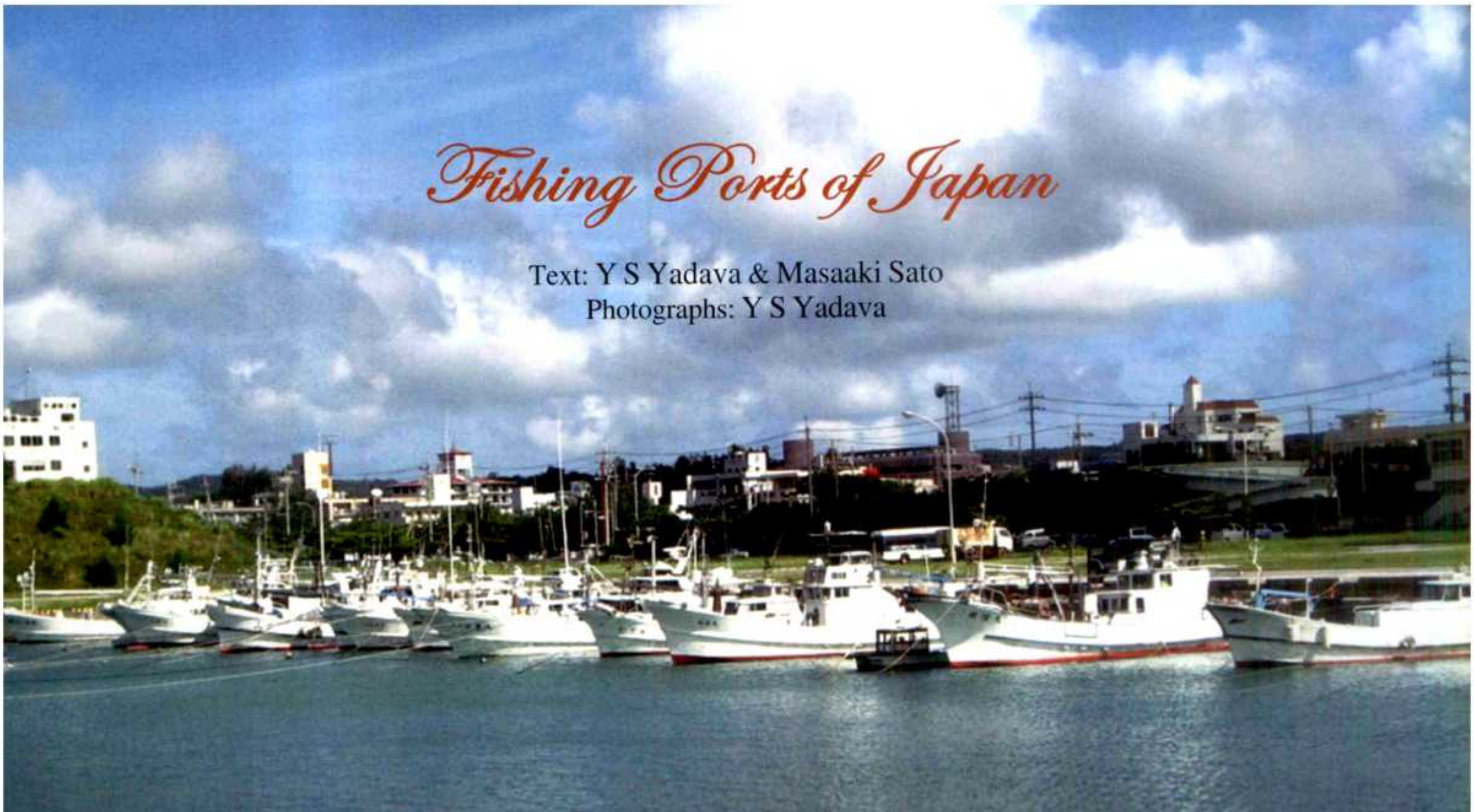
As financial officer in another project, concerned with masterplan studies for the development of fairways in the Baltic Sea, I enabled conflict resolution between fishing vessels and larger merchant vessels for safe fairways.

As regards technical experience, I have served as a pilot dispatcher in the Vessel Traffic Service (VTS) center in Göteborg – a heavily congested area often used as a working area by fishing vessels. I carried out coordination/logistic activities relating to piloting in the Port of Göteborg.

While with the T/S Gunilla soon after my business administration studies, I was busy with fire drills, 'man overboard' drills and other safety drills.

Q: You have been an editor and teacher as well.

A: I worked for some time with ***Smålandsposten,*** a daily newspaper, as local editor. I took photographs, wrote several articles and handled day-to-day editorial work. This experience proved handy for producing an annual report on the development of the Swedish maritime sector for the SMA in 2006. I have also published several articles in journals of the World Maritime University and the University of Gothenburg.



Fishing Ports of Japan

Text: Y S Yadava & Masaaki Sato
Photographs: Y S Yadava

Gleaming, spotless, picture-postcard-perfect: Japan's fishing harbours are icons of excellence in technology, management and upkeep. "Big investment alone doesn't ensure quality, it has to be married to discipline and commitment," remarked a visitor.

While governments play a major role in planning and constructing the harbours, day-to-day upkeep is often the responsibility of fisheries co-operative associations, and they do an impeccable job. Fishers and fisher associations in the Bay of Bengal region – take note!

Here's a word-and-picture tour of Japan's fishing ports illustrative, not comprehensive.

Japan has 2 917 fishing ports, distributed over five islands and 42 Prefectures (or provinces). A fishing port must be approved by the Minister in the Ministry of Agriculture, Forestry and Fisheries (MAFF) of the government of Japan before it can be commissioned. Local opinion is considered before approvals are given. The cost of commissioning a fishing port is shared by the Fisheries Agency and the Prefectural government concerned. Japan's fishing ports are managed either by Prefectural governments or by municipal governments and they are of four types, as described below:

Type 1 fishing ports (about 76 % of the total) are used mainly by local fishers.

Type II fishing ports (about 17 % of the total) cover a larger administrative area as compared to Type I fishing ports.

Type III fishing ports (about 4.0 % of the total) are used by fishing vessels of all the Prefectures of Japan. Of these, there are 13 key ports, labeled as 'Special Type III Fishing Ports (STTFP)', located in major fishing areas of Japan.

Type IV fishing ports (about 3.0 % of the total) are located in remote islands and/ or geographically disadvantaged areas. These ports help develop fishing grounds and shelter fishing vessels when the seas are rough.

Table 1 provides Island-wise distribution of different categories of fishing ports in Japan.

Special Type III Fishing Ports: The 13 STTFPs in Japan are strategically distributed among 11 Prefectures (Aomori, Miyagi, Chiba, Kanagawa, Shizuoka, Tottori, Shimane, Yamaguci, Fukuoka, Nagasaki and Kagoshima). Miyagi Prefecture alone has three STTFPs (Shiogama; Kesen-numa and Ishinomaki).

Kesen-numa port in Miyagi Prefecture is a famous hub for tuna

Table 1: Fishing ports in Japan

Island/ Prefecture	*Type I*	*Type II*	*Type III*	*Type IV*	*Total*
I. Hokkaido Island	215	30	18	21	284
II. Honshu Island	978	289	66	36	1369
III. Shikoku Island	344	48	8	4	404
IV. Kyushu Island	594	125	21	32	772
V. Okinawa Island	76	4	1	7	88
Total	**2207**	**496**	**114**	**100**	**2917**

Note: The number of STTFP ports are included in Type III Fishing Ports.

longliners and shark fin vessels. Yaizu fishing port in Shizuoka Prefecture is Japan's biggest fishing port for tuna landing. Many large tuna longliners (sizes ranging from 300 GT to 500 GT) which operate in the Indian Ocean, the Atlantic Ocean and the Pacific Ocean, unload their catch at this port.

Makurazaki fishing port (Kagoshima Prefecture in Kyushu Island) is famous for landing of skipjack (***Katsuonus pelamis)*** pole and line fishing vessels. Shimonoseki fishing port (Yamaguci Prefecture) is famous for landing of globefish, or puffer fish ***(Fugu rubripes***) from autumn to winter. The puffer fish is quite expensive, and often fetches 5 000 yen/ kg (about US$ 55/ kg at current exchange rate). The Hakata fishing port (Fukuoka Prefecture in the northern tip of Kyushu Island, close to Korea and China) is frequented by many Korean and Chinese fishing vessels to unload their catch. Fish transport vessels from these countries also frequently visit this port.

Process of commissioning a fishing port

When fishers want a port, they raise the issue at the general meeting of their Fisheries Cooperative Association (FCA). A resolution requesting a port is sent to the local government (municipality and Prefectural Government), which in turn approaches the Fishing Port Building Consultative Committee. At the same time, the local or Prefectural Government inspects the port site and draws up a plan, often employing private consulting companies.

The FCA lobbies with members of the local assembly, the Prefectural assembly and national Parliament members representing that Prefecture to hasten the decision-making process. Lobbying is a part of the strategy – since it's the Minister who has to approve of the port and the national government that has to fund it. A tug-of-war between different governments and agencies over budget allocation is common. The final power for site selection rests with the Minister of MAFF. The Central government usually meets half of the expense for a fishing port, and the Prefectural government the other half. Sometimes, the local government (city or town) pitches in with 25 percent.

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1-Fishing port of Aji FCA located at Aji-cho, Takamatsu city, Kagawa Prefecture; 2-Fishing port at Notsuke, Hokkaido; 3-Slipway facilities at a Fishing port operated by Nago FCA, Okinawa; 4- Fishing port operated by Shin Fukaura FCA in Aomori Prefecture; 5 A fishing village with fishing port facilities in Aomori Prefecture; 6- Oodose Wholesale Fish Market, Aomori Prefecture.

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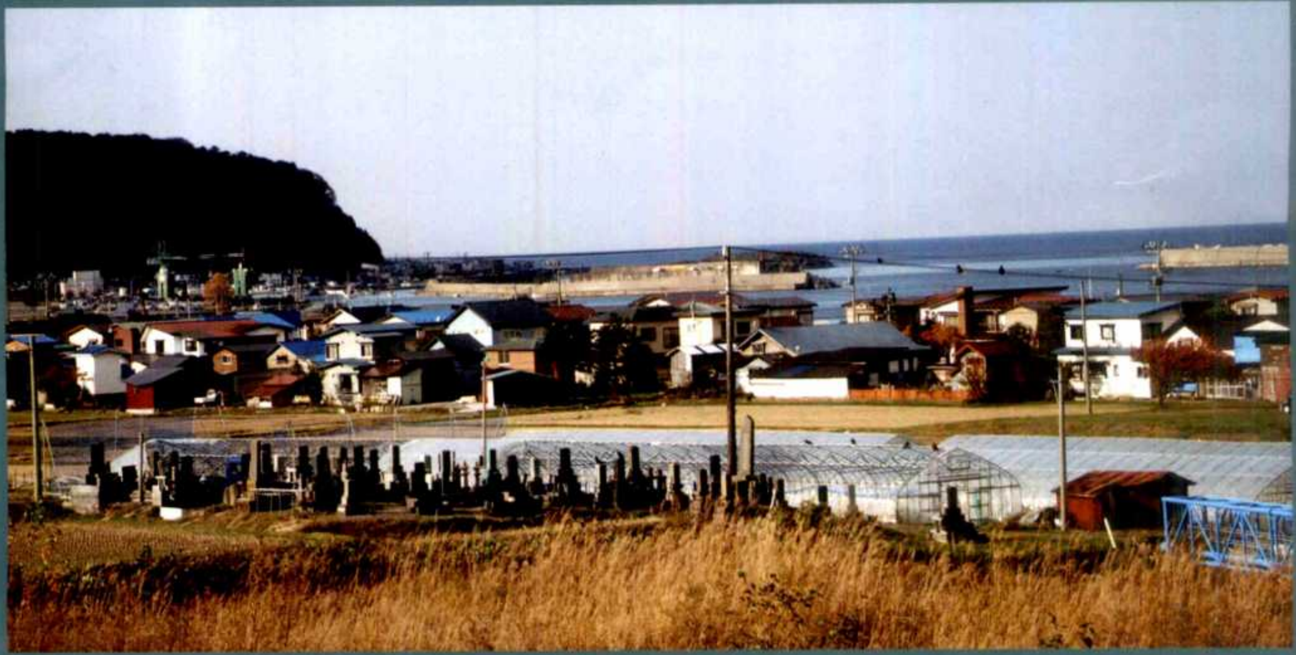

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Table 2: Criteria for classification of fishing ports

Type of fishing port	Criterion for classification of the port
Type I	More than 25 fishing vessels; < 250 GT in total gross tonnage. (For ports facing the Sea of Japan (SoJ), < 18 fishing vessels and < 175 GT). The catch landed should be < 1 125 metric tons per year (for ports facing the SoJ, it is 788 metric tons). The port has mooring and fish handling facilities and roads that are wider than 3m.
Type II (At least three criteria are fulfilled)	More than 50 local fishing vessels, with < 500 GT. In Prefectures facing the SoJ (Akita, Yamagata, Niigata, Toyama, Ishikawa, Fukui, Kyoto, Hyogo, Tottori, and Shimane Prefectures), the number is < 35 fishing vessels, with total gross tonnage <350 GT. More than 25 fishing vessels with < 250 GT. For ports facing SoJ, < 18 fishing vessels with <175 GT. The conditions for landing of catch and other facilities are same as required for Type I Ports.
Type III (At least three criteria are fulfilled)	More than 140 local fishing vessels, with gross tonnage < 2 400 GT. For Prefectures facing SoJ, < 98 fishing vessels of < 1 680 GT. More than 70 fishing vessels with < 1 600 GT. In case of Ports facing SoJ < 49 fishing vessels with gross tonnage < 1120 GT. The Annual fish landing at the Port should be < 5 000 metric tons; for Ports facing the SoJ it should be < 3 500 metric tons. The port should have has mooring and road facilities (wider than 5.5 m) or a railway line; facilities for fish handling, vessel repair, water supply, fuel supply, ice-making, freezer and cold storage are also mandatory.
Type IV The port should be situated either in remote island or in geographically disadvantaged area.	The port is especially necessary from the standpoint of fishing The port should be ground development (as a base port for development) and also situated either in as a shelter for fishing vessels. Further, there should be no remote island or in such port within 50 km radius. However, this criterion does geographically not apply for difficult areas (rapid currents, topographical disadvantaged areas. irregularities, threatening oceanic and weather phenomena). The port is expected to provide a reasonable calm water area. It must help strengthen the safety and efficiency of two or more fishing ports nearby and should strengthen development and assist in disaster mitigation.

Criteria for selecting sites for fishing ports

Article 6 of the Fishing Port and Fishing Ground Development Act (Law No. 137, 1950) lays out the criteria for constructing a fishing port. The site should have an enabling natural and economic environment, and should be used by local fishers as their base port. More than 20 local fishing vessels should patronize the site, and there ought to be a justification for a port (such as a need for shelter). Table 2 specifies the criteria for permitting various type of fishing ports.

The Fishery Policy Council

Any changes to a fishing port (concerning fresh construction or modernization, for example) must be approved by the Minister of MAFF, who will consult the Fishery Policy Council (FPC) and ascertain the views of local public entities as well. The FPC (19 members plus advisors) has three committees – a Planning Committee; a Fisheries Resources Committee; and a Fishing Port and Fishing Ground Development Committee.

Source: Gyokou Gyojou Gyoson (Handbook of Japan's Fishing Port, Fishing Ground and Fishing Communities, 2009).

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1-4: Fishing boats operating from ports in Japan; 5:Early morning auction in Hakodate Fishing port, Hokkaido.

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Safety at Sea in Bangladesh

Basic equipment and hands-on practices demonstrated to small-scale fishers

Artisanal and small-scale fisheries dominate the marine fisheries of Bangladesh. A severe handicap of artisanal fisheries is the absence of navigational, aid or communication gadgets – and even knowledge or awareness of these gadgets. In fact, fishers set out without even life jackets and life buoys, the most basic of personal protection equipment (PPE). Hence, when calamities strike – be they storms, pirates or boat malfunctions – casualties are high. In the absence of any social security net, formal or informal, a fisher's death means a destitute family. Good news: This situation is about to change.

Under the Global Project on Safety at Sea (South Asia), hands-on training sessions were organised in Cox's Bazaar (17-22 October 2008) to familiarize fishers with handheld GPS (global positioning system) and marine VHF Radio and promote the use of PPE as well as of emergency medicines and safe drinking water.

Demonstration of improvised PPE

Earlier that day, a large group of skippers and crew assembled in the Fishing Harbour operated by the Bangladesh Fisheries Development Corporation (BFDC) in Cox's Bazaar to witness a demonstration of GPS and PPEs by the Coast Guard officers. They were shown how to wear a life jacket and how to stow it, and how to use a handheld GPS system. The fishers learned how to start a GPS, keep track of the cruising route, change pages and note positions during distress.

For many fishers, the PPE demonstration was an eye-opener.

Such is their belief in their own swimming ability that they don't regard PPE as essential. But they learned from the Coast Guard trainers that PPEs would keep them afloat and alive at sea even if they fell unconscious. So many fishers drowned every year despite being good swimmers – because they fell unconscious. Further, could they swim much when the weather got rough?

Float rings vs life jackets: The demonstration included a 'contest' between locally improvised float-rings and a life jacket. The float rings were made by binding together 12-14 floats used to mark nets. They are tied to the waist. The 'contest' took place at the river mouth near the BFDC Harbour. The result was inconclusive. Both float rings and a life jacket can keep you afloat, but a life jacket is easier to wear and more comfortable to use. On the other hand, the float ring is far cheaper, and easier to store and maintain as well.

The story of Jaladas and Kalidas

This happened in the third week of July in 2007, at the start of the hilsa season. Sanatan Jaladas was on the crew of a 65 HP hilsa fishing vessel. He and 24 others were on their way to the Sundarbans. Disaster struck: bad weather, strong winds, vessel capsize! Sanatan was lucky, he caught hold of some marker floats, so did a few others. But he could not see Kalidas, his friend and neighbour. He was frantic, but all he could do was keep afloat himself by tightening his grip. Two hours later, Sanatan was rescued by another fishing vessel. But he lost five of his colleagues to the storm – including Kalidas.

Safety-cum-health awareness workshop

To promote basic safety-and-health practices among the fishers, a workshop was organised at Dakshin Dhurang Jelepara, a fisher settlement in Kutubdia upzilla, Cox's Bazaar, on the morning of 19 October 2008. Ferry services every hour link Dakshin Dhurang Jelepara to the mainland.

This was the first time an expert team was visiting the settlement, so a large group of men and women turned out. COAST, an NGO, facilitated the workshop, which was held in a local primary school.

The team consisted of
Dr Y S Yadava (BOBP-IGO),
Mr R Ravikumar (FAO),
Dr Shariffuddin and Mr Zahirul Haque (Department of Fisheries),

Mr S Jayaraj and Mr Rajdeep Mukherjee (BOBP-IGO).
Dr Misbah Uddin Ahmed, Resident Medical Officer, Government Hospital, Cox's Bazaar, accompanied the team.

During the three-hour session, fishers told the team about their problems out at sea. Most of them

Training in marine VHF radio and GPS

The use of Marine VHF Radio is unheard of in artisanal fisheries in Bangladesh – though international safety conventions declare that the use of VHF is a must (It often serves as the last resort of survival for a fishing vessel in distress). Of the country's 44 000 marine fishing vessels, only some 100 industrial trawlers have this facility.

On the afternoon of October 22, 2008, a group of 15 majhis (skippers) of artisanal fishing vessels were taken onboard the FV Moeen – a shrimp trawler operating in the Bangladesh EEZ. Their trainers: two officers from the Bangladesh Coast Guard. The majhis had 15 years of experience in fishing, but this was the first time they saw a VHF radio. They spent the first half hour of the training session seeing and feeling the device mounted on the cabin wall.

The majhis were all ears when the trainers explained the VHF device. They were told that it is a marine transmitter-cum- receiver. It operates only on standard international frequencies known as channels. Channel 16 is the international distress channel. Example: If fire breaks out in a vessel, the crew can transmit a 'fire' message through the channel and indicate their location.

As per international norms, ships and fishing vessels always keep their VHF active. When they pick up a distress call in their vicinity, they will rush to help. So will patrol boats of the Bangladesh Coast Guard.

Asked how a ship could locate the vessel in distress, the trainers pointed out that VHF radio is used in conjunction with the GPS system. Even a handheld GPS system can help to locate a vessel at sea. Asked one majhi: did he have to speak in ***ingraji*** (English) on VHF radio? Not necessary in Bangladesh waters, assured the trainer, But he urged the majhis to get familiar with all-important English words like 'fire', 'engine trouble' and 'medical emergency'. This knowledge would be useful. The majhis had indeed heard these words before.

"Simply great" was the first reaction of Moktar majhi after the demonstration. He remarked "Cell phones don't work when we get to sea. During the day we can shout or use hand signals, at night all that we can do is pray. I never knew that we could communicate distress so easily." He asked about the cost and availability of the equipment.

The majhis felt that they could talk to their boat owners about equipping the vessels with VHF sets and handheld GPS. One majhi quipped ***Amago jaan na houk, nuakatare bachaibar loge to mahajan lagaitei pare!*** ("The owner should do this to save his boat if not our lives.")

served as crew or as majhis skippers in fishing vessels that operated at Dublachar in the Sundarbans. During the fishing season, they were away from home for 5 to 6 months. During this period, they stayed in the Sundarbans to catch *hilsa, suri, dhaisa, roopchanda,* ribbon fish, shrimp and *loita*. Said the fishers "We have no PPE. The plastic or water containers and floats are the only floatation devices. We do carry radio sets and cell phones, but the phones are out of signal range. We carry some medicines too. Diarrhea is a severe problem. Every year, two or three deaths occur on account of diarrhea."

Dr Ahmed told the fishers about a simple method of purifying water using sunlight and plastic (PET) bottles. He said that water contamination was what caused diarrhea. (When fishers ran out of water during their prolonged stay in the Sunderbans, they drank from rivers or ponds.) But what the fishers could do was to fill up the PET bottles with water from a clean source, then place the bottles on the roof of the fishing vessel in sunlight. Exposure to sunlight for 4 to 6 hours in a sunny day neutralizes many of the harmful bacteria present in the water and makes it safer, said Dr Ahmed.

He also gave them advice on warding off the HIV infection, avoiding the use of tobacco products, vaccination of mother and child and the use of local food products – leaves and vegetables – to meet their dietary requirements. The fishers discussed their health problems with the doctor and enquired about treatment in Cox's Bazaar.

The workshop ended with a cultural programme that conveyed the messages of safety at sea and good health. A video documentary was made on the experiences of the fishers at sea and the problems a fisher family confronts when their breadwinner dies.

Another workshop the following day in another fisher settlement – Maijhgona jaladaspara, Chakoria Upzilla, Kutubdia. And another NGO, BASTOB, facilitated this workshop, held in the community hall of the Jaladaspara. The village had a cyclone-warning flag post maintained by the villagers.
Dr Shariffuddin explained the objective of the workshop.
Mr Zahirul Haque demonstrated the use of improvised marker floats as a floatation device.

The fishers shared their experiences on safety issues with the team. They said that piracy was a major threat; every year, hundreds of dacoities were common in the Cox's Bazaar area. Communication was a major problem, they said. They carried cell phones (which didn't work in the sea) and transistors (which often broke down). The team advised the fishers about proper maintenance of transistor sets and about the need to frequently check the weather bulletin. The fishers complained that they were made to work even when cyclone signal 3 was announced. Said one fisher: "Catch rate of fish before a storm is high, hence the skipper encourages the crew to linger and keep fishing."

Video documentary

Engine malfunction is behind much of the distress that afflicts fishing vessels out at sea. There are some 44 000 fishing vessels in Bangladesh of which a majority use engines for propulsion. Most of these engines are reconditioned – new engines are costly. Fishers believe that the reconditioned engines work well enough. But when they are not properly maintained, these reconditioned engines break down during a voyage and endanger the lives of crew.

The BOBP-IGO enlisted Mr M Srinath, an expert in engines, to help out with an educational video on engine maintenance for the fishers of Bangladesh. The first round of shooting for this video was done during 16-23 October in Cox's Bazaar and Chittagong. It focused on basic facts about the common type of engines in use in Bangladesh, their availability, common engine problems faced during fishing trips, trouble-shooting practices, what engine-repair workshops could do, A leading engine repair workshop, Jalal Mechanical Workshop, provided the facilities.

A bilingual video (Bengali and English) is being prepared. It will be disseminated through the Marine Fisheries Office, Department of Fisheries, as well as through harbour management organisations and NGOs.

National Workshop on Monitoring, Control and Surveillance (MCS), 22-23 March 2009, Malé, Maldives

MCS in Maldivian waters presents a range of unique problems including IUU fishing; licensing; conservation of vulnerable species; and optimum realization of available resources. This national workshop is to formulate a roadmap to ensure responsible management of fisheries resources in Maldives. The workshop will be in held in coordination with the Ministry of Fisheries and Agriculture, Government of Maldives.

Fourth Meeting of the Technical Advisory Committee (TAC), 22-23 April 2009, Dhaka, Bangladesh

This meting will discuss activities carried out by the BOBP-IGO during the period April 2008-March 2009. The TAC will also help the Secretariat to prepare an activity matrix for the period April 2009 March 2010 for approval by the Governing Council of the BOBP-IGO slated to meet later in 2009.

Awareness campaign on Safety at Sea, Cox's Bazaar, Bangladesh

Awareness campaigns on safety at sea for small-scale fishers will be organized during April 2009 in two sites of Cox's Bazaar, Bangladesh. These pilot sites have been selected under the South Asia component of the FAO Global Project on Safety at Sea. The awareness campaigns will include stakeholder meetings and demonstration of safety gear, personal hygiene, etc. Village theatre groups will also be used for the awareness campaign.

Fourth International Conference on Fishing Industry Safety and Health (IFISH-4)

The BOBP-IGO is cooperating with the FAO, NIOSH, the Institute for Sustainable Development, the University of Iceland and The Icelandic Maritime Administration, Iceland, in organizing the Fourth International Fishing Industry Safety and Health Conference (IFISH-4) in Reykjavik, Iceland from 11 to 14 May 2009. With funds made available by the FAO, the BOBP-IGO is sponsoring 14 participants from developing countries. The Conference aims at building an international coalition, and at promoting action to prevent injury and improve health in the commercial fishing industry. For details see the IFISH-4 website (http://www.ifishconference.org/index.htm).

Regional Consultation on Sea Safety, June 2009, Chennai, India

Fishing always entails risks, and there is now a consensus on the need for obligatory safety training. The FAO is implementing the SIDA funded global project on 'Safety at Sea for Small-scale Fisheries in Developing Countries' from 2007. The Project advocates a holistic approach to fisheries management with safety at sea as an integral part of the management framework. This Regional Consultation will review the accomplishments under the Project in South Asia; discuss the Safety Guidelines for Fishing Vessels under 24 meters in length; and plan future activities on safety-at-sea initiatives.

Fifth Meeting of the Governing Council of the BOBP-IGO, June 2009, Chennai, India

The Governing Council is the highest decision making body in the BOBP-IGO. The most senior representatives of member-governments Bangladesh, India, Maldives and Sri Lanka will take part. The Governing Council will review the activities implemented during the period April 2008- March 2009 and will finalize the plan for April 2009-March 2010.

Second Regional Training Course on the Code of Conduct for Responsible Fisheries, June 2009, Chennai/Mumbai, India

This course will be held in association with the Central Institute of Fisheries Education, Mumbai. Sixteen delegates from Bangladesh, India, Maldives and Sri Lanka will take part. The course is meant to educate junior and middle-level fisheries officials on the principles and practices of CCRF through lectures, community interaction, group discussion and personal assignments.

Awareness Materials

The BOBP-IGO has brought out a variety of awareness promotion materials on safety at sea (illustrations on this and the facing page.)

Precautionary messages

Ten colour handout sheets (in English, Tamil, Telugu and Bangla) on preventing, mitigating or confronting disaster at sea have been prepared and distributed to fishers in India and Bangladesh.

"Safety first" tells fishers about what they should do and what precautions they should take before starting on their fishing trip. Like telling their family members where they will be fishing and who will be going out with them.

"Standard marine distress signals" instruct fishers on how they should tell the world that they are in trouble. They can send up a "parachute rocket" – a cloth balloon that can light up at the tail and create a red flare noticeable from afar. They can create an orange smoke flare. They can create an on-off flare with a hand-held device, or a yellow-coloured flare in the water through another device. They can keep putting a torch on and off.

They can create a red streamer in the water, for aircraft to spot. They can send out sound signals through intermittent blasts of a horn. An arm signal – both arms outstretched – can convey a 'Help' message to rescuers who are near.

"Cyclone warning signals": There are 11 cyclone warning messages varying in kind and degree – about the likelihood of squally weather, a storm forming, a moderate storm, a severe storm, failure of communications with the meteorological centre, etc. Harbour authorities flash these messages on flagposts raised high to help fishers

CYCLONE WARNING SIGNALS
DIESEL ENGINE CHECKLIST
OUT BOARD MOTOR CHECKLIST
Flush the engine after every trip
SAFETY FIRST!
STANDARD MARINE DISTRESS SIGNALS
Radio Distress Calling
MAN OVERBOARD
OUTBOARD MOTOR PERIODIC INSPECTION AND SERVICE
LIGHTS AND SIGNALS
Knowing Your Position at Sea
How to use a GPS

Laminated placards for awareness on Safety at Sea.

setting out to sea, or fishers who are close to the harbour.

"Lights and signals". A power-driven fishing vessel uses these to inform others about its activity – not engaged in fishing, engaged in trawling, etc.

"Man overboard": What steps should a person on a boat take when someone falls overboard? These simple sketches provide guidance.

"Radio distress calling": What code words should you use to convey distress quickly and effectively to a radio station? 'Mayday' conveys danger. Utter the word 'Mayday' a few times. 'Pan pan' means you need urgent help. The radio user should follow up by conveying his vessel's position, the kind of assistance needed, etc.

Engine maintenance

Three handout sheets have been prepared for engine mechanics. They are "diesel engine checklist," "outboard motor checklist" and "Outboard motor: periodic inspection and service".

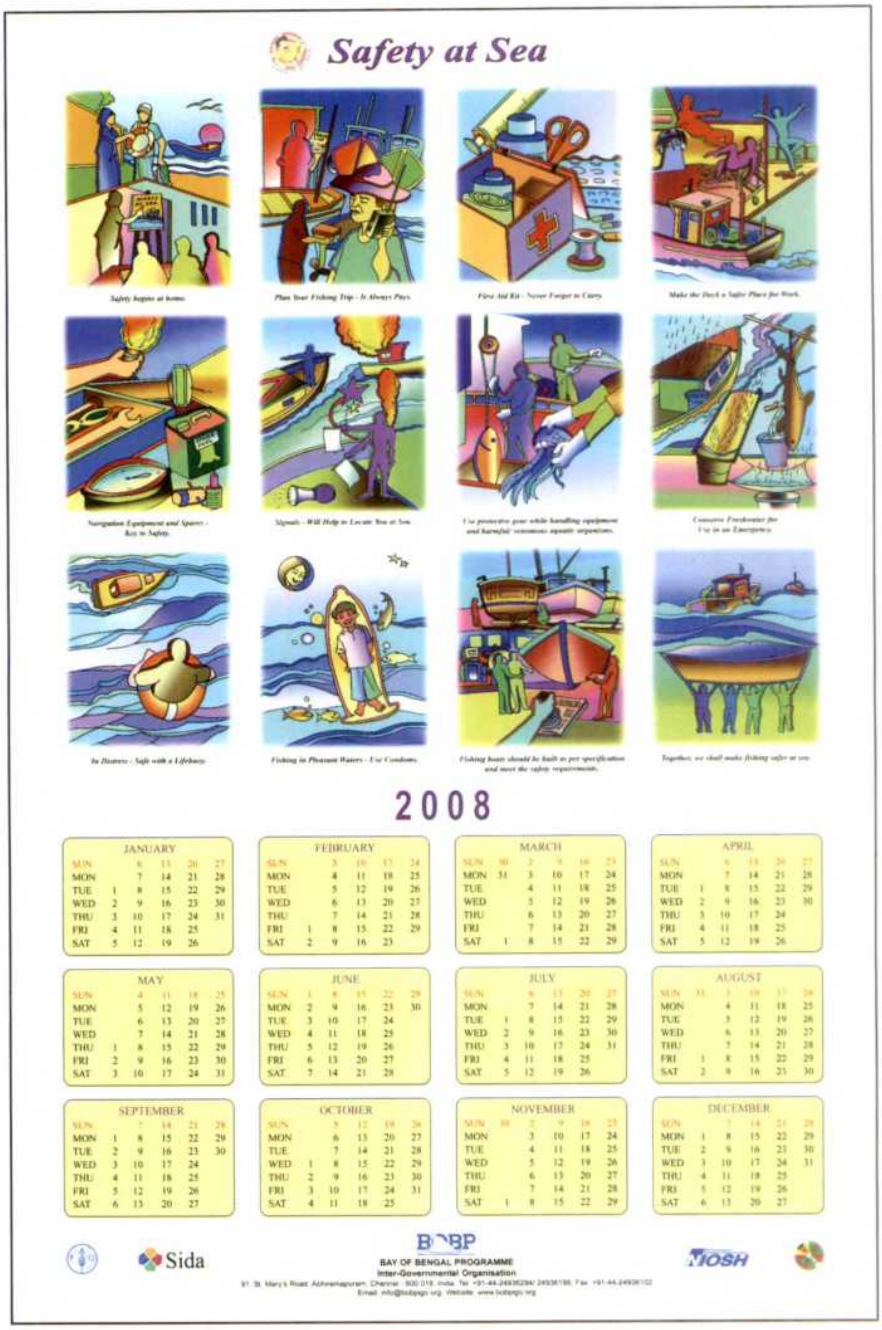
Poster calendar

A poster calendar or a single-sheet wall calendar repeats the themes and months of BOBP-IGO's 2008 calendar on safety at sea. It has been given to officials and fisher associations. Its 12 illustrated messages are: Safety begins at home. Plan your fishing trip – it always pays. Fist-aid kit – never forget to carry. Make the deck a safer place for work. Navigation equipment and spares – keys to safety. Signals will help to locate you at sea. Use protective gear while handling equipment and harmful aquatic organisms. Conserve fresh water, When in distress, you are safe in a lifebuoy. Fishing in pleasant waters – use condoms. Fishing boats should be built as per specifications and safety requirements. "Together we shall make fishing safer". (Fishers, boatbuilders, boat owners, the authorities).

SAFETY AT SEA
SMALL-SCALE FISHERIES

Safety at sea T-shirts

Three thousand simple but elegant **cotton T-shirts** emblazoned with a safety-at-sea logo (see above) have been manufactured. They are being distributed to officials and fishers of Bangladesh, India, Maldives and Sri Lanka.



Safety at Sea

Safety begins at home.

Plan Your Fishing Trip - It Always Pays

First Aid Kit - Never Forget to Carry

Make the Deck a Safer Place for Work.

Navigation Equipment and Spares - Key to Safety.

Signals - Will Help to Locate You at Sea.

Use protective gear while handling equipment and harmful/ venomous aquatic organisms.

Conserve Freshwater for Use in an Emergency.

In Distress - Safe with a Lifebuoy.

Fishing in Pleasant Waters - Use Condoms.

Fishing boats should be built as per specification and meet the safety requirements.

Together, we shall make fishing safer at sea.

2008

JANUARY					
SUN		6	13	20	27
MON		7	14	21	28
TUE	1	8	15	22	29
WED	2	9	16	23	30
THU	3	10	17	24	31
FRI	4	11	18	25	
SAT	5	12	19	26	

FEBRUARY					
SUN		3	10	17	24
MON		4	11	18	25
TUE		5	12	19	26
WED		6	13	20	27
THU		7	14	21	28
FRI	1	8	15	22	29
SAT	2	9	16	23	

MARCH					
SUN	30	2	9	16	23
MON	31	3	10	17	24
TUE		4	11	18	25
WED		5	12	19	26
THU		6	13	20	27
FRI		7	14	21	28
SAT	1	8	15	22	29

APRIL					
SUN		6	13	20	27
MON		7	14	21	28
TUE	1	8	15	22	29
WED	2	9	16	23	30
THU	3	10	17	24	
FRI	4	11	18	25	
SAT	5	12	19	26	

MAY					
SUN		4	11	18	25
MON		5	12	19	26
TUE		6	13	20	27
WED		7	14	21	28
THU	1	8	15	22	29
FRI	2	9	16	23	30
SAT	3	10	17	24	31

JUNE					
SUN	1	8	15	22	29
MON	2	9	16	23	30
TUE	3	10	17	24	
WED	4	11	18	25	
THU	5	12	19	26	
FRI	6	13	20	27	
SAT	7	14	21	28	

JULY					
SUN		6	13	20	27
MON		7	14	21	28
TUE	1	8	15	22	29
WED	2	9	16	23	30
THU	3	10	17	24	31
FRI	4	11	18	25	
SAT	5	12	19	26	

AUGUST					
SUN	31	3	10	17	24
MON		4	11	18	25
TUE		5	12	19	26
WED		6	13	20	27
THU		7	14	21	28
FRI	1	8	15	22	29
SAT	2	9	16	23	30

SEPTEMBER					
SUN		7	14	21	28
MON	1	8	15	22	29
TUE	2	9	16	23	30
WED	3	10	17	24	
THU	4	11	18	25	
FRI	5	12	19	26	
SAT	6	13	20	27	

OCTOBER					
SUN		5	12	19	26
MON		6	13	20	27
TUE		7	14	21	28
WED	1	8	15	22	29
THU	2	9	16	23	30
FRI	3	10	17	24	31
SAT	4	11	18	25	

NOVEMBER					
SUN	30	2	9	16	23
MON		3	10	17	24
TUE		4	11	18	25
WED		5	12	19	26
THU		6	13	20	27
FRI		7	14	21	28
SAT	1	8	15	22	29

DECEMBER					
SUN		7	14	21	28
MON	1	8	15	22	29
TUE	2	9	16	23	30
WED	3	10	17	24	31
THU	4	11	18	25	
FRI	5	12	19	26	
SAT	6	13	20	27	

Sida

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NIOSH

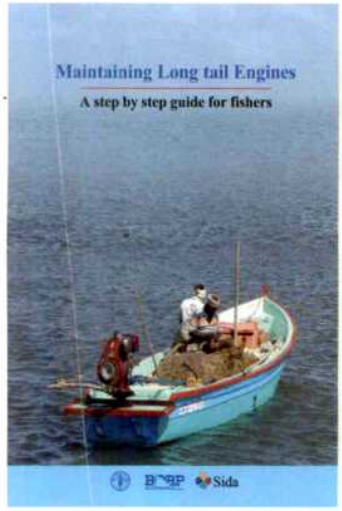
Video film on engine care

Maintaining Long tail Engines
A step by step guide for fishers
Maintaining Long tail Engines
A step by step guide for fishers
DVD
BOBP
Sida

An 18-minute **video film** has been prepared **on "Maintaining Long tail Engines".** Meant to be a step-by-step guide for fishers of the East Coast of India, it contains do's and don'ts on engine care and maintenance to ensure safety at sea. The film has been translated into Tamil and Telugu, and may be translated into other languages as well.

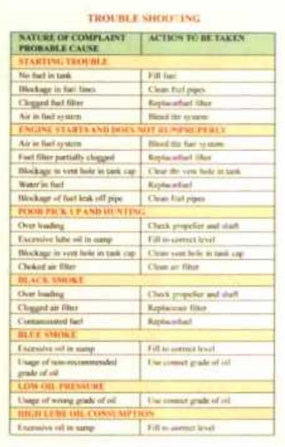
The film describes the various parts of the engine and the propulsion unit and their functions. It contains a checklist, of various checks they should perform – about necessary spares, oil levels, fittings in good condition, fuel systems, etc. There's a list of do's and don'ts.

The film was received very well by fishers and engine mechanics in India.



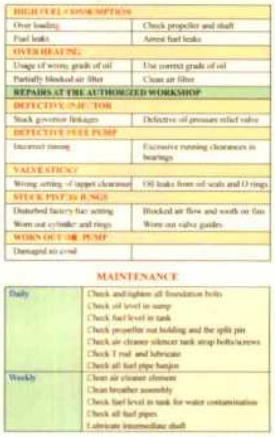
Maintaining Long tail Engines
A step by step guide for fishers

BOBP Sida



TROUBLE SHOOTING

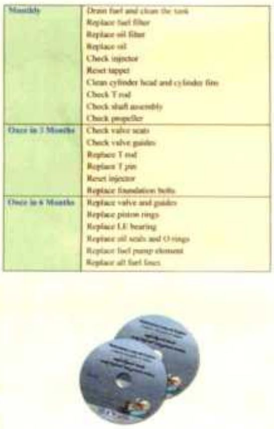
NATURE OF COMPLAINT PROBABLE CAUSE	ACTION TO BE TAKEN
STARTING TROUBLE	
No fuel in tank	Fill fuel
Blockage in fuel lines	Clean fuel pipes
Clogged fuel filter	Replacefuel filter
Air in fuel system	Bleed the system
ENGINE STARTS AND DOES NOT RUN PROPERLY	
Air in fuel system	Bleed the fuel system
Fuel filter partially clogged	Replacefuel filter
Blockage in vent hole in tank cap	Clear the vent hole in tank
Water in fuel	Replacefuel
Blockage of fuel leak off pipe	Clean fuel pipes
POOR PICK UP AND HUNTING	
Over loading	Check propeller and shaft
Excessive lube oil in sump	Fill to correct level
Blockage in vent hole in tank cap	Clean vent hole in tank cap
Choked air filter	Clean air filter
BLACK SMOKE	
Over loading	Check propeller and shaft
Clogged air filter	Replaceair filter
Contaminated fuel	Replacefuel
BLUE SMOKE	
Excessive oil in sump	Fill to correct level
Usage of non-recommended grade of oil	Use correct grade of oil
LOW OIL PRESSURE	
Usage of wrong grade of oil	Use correct grade of oil
HIGH LUBE OIL CONSUMPTION	
Excessive oil in sump	Fill to correct level



HIGH FUEL CONSUMPTION	
Over loading	Check propeller and shaft
Fuel leaks	Arrest fuel leaks
OVER HEATING	
Usage of wrong grade of oil	Use correct grade of oil
Partially blocked air filter	Clean air filter
REPAIRS AT THE AUTHORIZED WORKSHOP	
DEFECTIVE INJECTOR	
Stuck governor linkages	Defective oil pressure relief valve
DEFECTIVE FUEL PUMP	
Incorrect timing	Excessive running clearances in bearings
VALVE STICKY	
Wrong setting of tappet clearance	Oil leaks from oil seals and O rings
STUCK PISTON RINGS	
Disturbed factory fuel setting Worn out cylinder and rings	Blocked air flow and soot on fins Worn out valve guides
WORN OUT OIL PUMP	
Damaged oil seal	

MAINTENANCE

Daily	Check and tighten all foundation bolts Check oil level in sump Check fuel level in tank Check propeller nut holding and the split pin Check air cleaner silencer tank strap bolts/screws Check T rod and lubricate Check all fuel pipe banjos
Weekly	Clean air cleaner element Clean breather assembly Check fuel level in tank for water contamination Check all fuel pipes Lubricate intermediate shaft



Monthly	Drain fuel and clean the tank Replace fuel filter Replace oil filter Replace oil Check injector Reset tappet Clean cylinder head and cylinder fins Check T rod Check shaft assembly Check propeller
Once in 3 Months	Check valve seats Check valve guides Replace T rod Replace T pin Reset injector Replace foundation bolts
Once in 6 Months	Replace valve and guides Replace piston rings Replace LE bearing Replace oil seals and O rings Replace fuel pump element Replace all fuel lines

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